ATTACHMENT 18

UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SAN JOSE DIVISION

CISCO SYSTEMS, INC., Plaintiff, v. ARISTA NETWORKS, INC., Defendant.	Case No. 5:14-cv-05344-BLF (PSG) **OPENING EXPERT REPORT OF WILLIAM M. SEIFERT**

CONTAINS CONFIDENTIAL MATERIAL SUBJECT TO PROTECTIVE ORDER

Executed on the 3 of June 2016 in Wellesley, Massachusetts.

William M. Seifert

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I. INTRODUCTION

1. Arista has engaged me to provide expert testimony to assist the jury on matters related to Cisco's allegations of copyright infringement and Arista's defenses to those allegations. I understand that Cisco has alleged that Arista's use of certain features or aspects of Cisco's Command Line Interface (CLI) that Cisco claims is covered by copyright constitutes copyright infringement. When I write in reference to Cisco's CLI, I am referring to all of the aspects of the CLI that Cisco alleges Arista copied: the identified CLI commands, the asserted hierarchies of those commands, the command modes and prompts, and the identified command response elements.

2. Arista has asked me to provide expert testimony as to several topics. First, Arista has asked me to provide background explanation regarding the development of the networking industry and the importance of interoperability in the growth of that industry. In particular I have been asked to comment about the development of *de facto* standards in the computer industry generally, and in the networking industry in particular.

3. Second, Arista asked that I provide background concerning the use of CLIs generally, and the growth of the adoption of CLI as a means for managing network equipment. In this regard, I have been asked to opine as to whether Cisco's CLI has, at least prior to Cisco filing this lawsuit, become a *de facto* industry standard interface in the networking industry, that Cisco has in fact benefitted from its CLI being incorporated into other vendors' products over the years, and to explain why, as a matter of business judgment, it has been and will continue to be reasonable for a copyright holder in Cisco's position to allow and even encourage the adoption of its CLI as an industry standard.

4. Lastly, I have been asked to provide a background explanation of the market segments in which Arista competes, and to evaluate what, if any, effect Arista's use of the CLI

features in which Cisco claims copyright has had on the market for Cisco's asserted copyrighted works. I understand that Cisco's asserted works are not "the CLI" but rather various versions of Cisco's entire operating systems, including IOS and NX-OS, and associated documentation.

II. SUMMARY OF OPINIONS

5. Since its beginnings, computer networking has been based on industry standards. This is largely because the Internet—a direct descendent of the Advanced Research Projects Agency Network (ARPANET)—is a product of the university research community, which promotes the open sharing of ideas and results. The creation of the Internet Engineering Task Force (IETF) in the 1980s in particular provided engineers with an open forum to freely exchange ideas, many of which were then borrowed and implemented. Eventually, the IETF became the organization responsible for creating the specifications of the Internet.

6. This report focuses on the development of *de facto* industry standards—ones that emerge over time as a result of widespread adoption throughout a given industry—as opposed to standards that have been defined and approved by standards organizations or standards that are set and owned by a single company. Early examples of *de facto* industry standards include the software protocol TCP/IP, which was incorporated in University of California, Berkeley's version of UNIX, 4.2BSD—which itself became a *de facto* industry standard due to its widespread adoption. Together, the two formed the genesis of today's Internet.

7. Many modern-day networking companies can trace their origins to these early days, when innovation was driven by the collective efforts of the networking community rather by any single vendor or entity. Cisco is no exception. Cisco is rooted in Stanford University's efforts to build a university-wide network. Its cofounders were two Stanford University employees who built a business that profits, in part, from the open industry standards that

Cisco's products are based in. Cisco's own routers incorporate many *de facto* industry standard 4BSD applications and commands.

8. Early on, router vendors each implemented their own command line interface (CLI) design, which is the human interface for interacting with a computer's operating system through text commands and responses. Vendors like Digital and Proteon implemented some of the first CLI commands which found their way into routers. Cisco did not develop its own CLI until the early 1990s. Much of Cisco's CLI design was substantially influenced by its predecessors. Other vendors designed their CLIs to employ common English commands with multiple keywords, many of which were industry terms then in existence, including some acronyms. Cisco's CLI design draws heavily from those of other router and network equipment manufacturers.

9. Network engineers undertake costly and time-consuming training to learn vendors' products, including a CLI. As networks grew in size and number, customers began to demand a standard CLI for networked devices, including switches and routers. An industry-standard CLI reduces training time and expense, reduces human error, and improves productivity. As Cisco's market share grew, Cisco's CLI was widely accepted as an industry standard.

10. Cisco capitalized on this development by promoting its CLI as *the* industry standard. Through this promotion, Cisco projected an image of leadership, continuity, and consistency. This provided a clever means of convincing customers that they would not be locked into Cisco's products. The customer retained the flexibility to purchase competing products, with assurance that the Cisco industry-standard CLI offered efficient operation of each

device in a multi-vendor network. These factors served to reinforce Cisco's dominant market position.

11. Many network vendors coalesced around the now industry-standard CLI—Cisco's. Companies like Hewlett Packard, Dell, Blade Network Technologies, and Nortel promoted the benefits of a "Cisco-like" or "industry standard" CLI in their marketing efforts. Cisco's CLI became a *de facto* industry standard. Cisco was aware that this was happening and clearly benefitted from it. Had this not occurred, Cisco might have watched another vendor's CLI emerge as the *de facto* industry standard. Cisco might have had to align its products with a different CLI— another vendor's industry-standard CLI. The promotion of its CLI as an industry standard was necessary for Cisco to maintain its market leadership.

12. Cisco has acquired or developed products that utilize the commands, keywords, and data structures of other vendors' CLIs. Cisco recognizes that it does not dominate every segment of the networking marketplace. For those market segments, Cisco's products must seamlessly integrate with other vendors' products to satisfy their customers. Integrating other vendors' CLI commands, keywords, etc., into its products has become a business imperative for Cisco.

13. An industry-standard CLI is not the driver of any single vendor's success, however. Customers' networks place great demands on vendor equipment particularly on performance, resiliency, and reliability. Customers also demand quality and support at a competitive price. Arista's products, for example, are well-known for their sustained high throughput performance, low latency and jitter. Arista's products are power efficient, reducing customers' cost of operation and ownership. Arista's products are designed around an

architecture that accelerates delivering new products to market, enables customization, with superior resiliency and reliability.

14. The market share and customer decision-making evidence from Arista customers strongly suggests that Cisco has not suffered economic harm from Arista's use of a *de facto* industry-standard CLI. Products from Cisco's competitors that most closely resemble Cisco's industry-standard CLI have had a negligible impact on Cisco's market share. Arista's success in the markets that it serves has come about due to performance, features, and product and service attributes that serve the growing cloud computing market better than the competition, not from having a common CLI.

III. PROFESSIONAL QUALIFICATIONS

15. I have been involved in the local networking industry since its inception. The Ethernet was the first commercially successful local networking technology, and I was the first engineer hired by an Ethernet pioneer, Interlan, Inc., in 1981. I was also co-founder of an early router manufacturer, Wellfleet Communications, in 1986. I went on to start a third networking company, Agile Networks, in 1991, and became a professional investor in several networking companies (1998-2009). I have witnessed first-hand the evolution of this industry—from the installation of early Ethernets, to Wellfleet's deployment of the first multiprotocol router-bridge used to interconnect many of those Ethernets, and finally the rapid growth of early enterprise and carrier internetworks which have transformed into the modern Internet. I also observed the Cisco CLI emerge as a *de facto* industry standard, implemented by dozens of vendors, to Cisco's economic benefit and promoting its market dominance. I have direct experience setting corporate strategy including product development and strategy, assessing customer demands and preferences and analyzing markets and market trends in the networking industry.

16. While employed by Digital Equipment Corporation (Digital) from 1979 to 1981, among other product responsibilities, I was tasked with representing the LSI-11 Product Group as the Group's reviewer of the Digital-Intel-Xerox Ethernet Specification 1.0, published in September 1980.[1] This specification was the basis for virtually every Ethernet installed since.

17. I left Digital in the spring of 1981 to become a co-founder of and design engineer for Interlan, Inc., Chelmsford, Mass, an early manufacturer of Ethernet controller, software and system products. At Interlan, I was involved in writing much of the firmware and software for several Interlan products including the NM-10 Ethernet network module, the NTS-10 Network Terminal Server, device drivers for the Q-bus and Multibus Ethernet controllers, and much of the network protocol software based on Xerox Network Systems (XNS) specifications.

18. Interlan was responsible for providing several hundred customers' Ethernet installations, and it became apparent to me by 1984 that we had created a problem for those customers—namely, we lacked a compelling technological solution to the interconnection of those Ethernets within an enterprise. At that time, it seemed that every new Ethernet installation would typically be carrying three or more higher level protocols—XNS, TCP/IP (the protocol that now carries all Internet traffic), DECnet, and DECnet's adjunct protocols such as MOP (Maintenance and Operations Protocol) and LAT (Local Area Terminal) which had no network layer. The absence of a network layer meant that DECnet-compatible routers could not forward them from one Ethernet to another. Bridging technology (now called "switching") existed at the time that would forward all of the traffic between interconnected Ethernets, but it had serious deficiencies that limited the scale and reliability of the resulting network. What was needed was a new way of connecting networks—*internetworking*—that permitted every connected device to communicate with others as though they were all on the same network.

[1] "The Ethernet, A Local Area Network," Digital-Intel-Xerox, September, 1980.

19. I left Interlan in the fall of 1985, following the acquisition of Interlan by Micom Systems, Simi Valley, California. In May 1986, I founded Wellfleet Communications with four ex-Interlan colleagues. Wellfleet was the first vendor to combine multi-protocol routing with bridging technology in a single product. This solved the problem that we had helped to create at Interlan and greatly simplified the creation of richly connected Ethernets into a cohesive enterprise network within a large building, across a campus, or over large distances. We accomplished this by employing a variety of technologies including T-1 leased circuits, X.25 networks, FDDI, 802.5/IBM token ring networks, etc. to support multi-vendor computing environments including those from Digital, Data General, IBM, Apple Computer, Apollo Computer, Sun Microsystems, Xerox STAR and Alto systems, and the IBM PC. Each of these systems employed different network protocols—DECnet, TCP/IP, XNS, Novell, AppleTalk and others—which required specific routing (or bridging) software to permit compatible computers to communicate with one another throughout the customer's enterprise.

20. Wellfleet Communications became the number one competitor to Cisco Systems with the release of our first products in the summer of 1988. Wellfleet was consistently number two to Cisco in terms of market share of routers for several years. We competed with Cisco on the basis of performance, completeness of multi-vendor protocol support, scalability, reliability, and ease of installation and service. Wellfleet was also an early entrant in the carrier router market with customer wins at MCI, Sprint, Bell Atlantic, and others. Because our hardware system design was based on loosely-coupled, symmetric multiprocessing, it was particularly adept at providing consistently high performance in routing (layer 3) or bridging (layer 2) traffic between networks. This meant that our customers could decide at installation time to "bridge today, route tomorrow" based on their individual technical requirements and network design

criteria. This flexibility made Wellfleet's products appealing to a significant segment of the enterprise router market. By the fall of 1993, Wellfleet had approximately 17% of the multivendor router market.[2]

21. I was an active participant in the IETF—the Internet Engineering Task Force—in particular as a member of the Benchmark Working Group (BMWG) chaired by Scott Bradner of Harvard University. The purposes of this Working Group were to: define the types of measurements needed to characterize router performance; provide a set of terms and their definitions for describing a router's performance, e.g., throughput, latency; and describe the methods employed to measure a router's performance characteristics in a reproducible manner. I drafted several definitions of measurement terms, proposed some of the methodology for testing routers and bridges, and wrote portions of the group's final report, published in July 1991, as RFC 1242, "Benchmarking Terminology for Network Interconnection Devices." I was also active in various conferences hosted by the IEEE 802 committee, the XNS Implementers' Group, as well as the company's first VP, Engineering, and later as the Chief Technology Officer. I spent considerable time supporting our sales and customer support organization, actively assisting in solving customer deployment problems and bug fixes.

22. I left Wellfleet in November 1991 to pursue another startup company, Agile Networks, as the CEO. Agile Networks, which I co-founded in late 1991 with two former Interlan colleagues, was focused on employing the emerging ATM standards into a distributed building/campus backbone switch that utilized Ethernet switching for connecting desktop computers with a 155 Mbps industry-standard ATM backbone network. We added a novel software capability that we called "Relational Networking" designed to provide a layer-3 (IP) virtual network between computers physically attached to different Ethernet segments. Agile

[2] "Routers Buyers Guide," Network World, September 27, 1993.

Networks was the first company acquired by Lucent Technologies in October 1996, shortly after its spin-out from AT&T. After serving as the President, Agile Networks Division of Lucent for a year, I left in November 1997.

23. In 1998, I was approached by the founding General Partner of Prism VentureWorks, to join the firm as the fifth General Partner to assist in raising the second fund, Prism II. I served as a General Partner of the firm for the next twelve years, through the raise and deployment of Prism V. I led the firm's investments in several networking ventures including: DSL.net (IPO in 2000), Telica (acquired by Lucent in 2005), Colubris Networks (acquired by HP, 2008), and Axsun Technologies (acquired by Volcano in 2009). I also assumed Prism's director seats for Collation (acquired by IBM in 2007), and SiGe Semiconductor (acquired by Skyworks Solutions in 2011). I retired as a General Partner of Prism VentureWorks at the end of 2009, retaining my active board responsibilities through 2011.

24. I was hired by Avaya, Inc., Basking Ridge, New Jersey, in April, 2010, as the Chief Technology Officer for the Data Solutions (later renamed Networking) Division. I was tasked initially with assisting Avaya management in enhancing the company's strategic goals and operational plans for integrating the newly acquired business, formerly the Nortel Enterprise Division. I initiated technology discussions with a number of potential partners such as Oracle that might enable Avaya to more tightly integrate its Unified Communications software products with the former Nortel switching and routing products, intending to broaden the appeal of Avaya's technologies for a larger, ultimately cloud-based, set of enterprise customers. I also assisted the former Nortel networking support engineers, Avaya distributors and resellers with a variety of customer issues, drawing upon Avaya's customer support and oftentimes design engineers for problem resolution. I participated in a number of Avaya customer symposia,

tradeshows, and other events, frequently being asked to provide my perspective on the future of data networking given my extensive background and experience in the industry.

25. I left Avaya in October 2013, to pursue my interest in free-agent consulting and volunteer board service principally aimed at mentoring young entrepreneurs, continuing to the present day.

26. I am the author of "Bridges and Routers," published by the IEEE Network periodical, a seminal article on the technology employed by Cisco and Arista Networks.

27. I am being compensated for my work in this litigation at the rate of $600.00 per hour. My compensation does not depend in any way on the outcome of this litigation, nor do I have any financial interest in this case.

28. I have not given any testimony at trial or by deposition in the past four years. My qualifications are attached hereto as Exhibit A.

IV. EVIDENCE CONSIDERED

29. My opinions are based on my relevant knowledge and experience in the networking industry. I have specialized knowledge of the matters set forth herein, and if called as a witness I could and would testify competently thereto.

30. In forming my opinions and preparing this report, I have also considered the materials cited and listed in this report, as well as the documents listed in Exhibit B to this report. Attached hereto as Exhibits C through E are Appendix C, Appendix H.Br, and H.DE to the Opening Report of John Black.

31. In addition, I have had conversations with individuals who were involved in the development of certain products or possessed knowledge in specific areas of networking:

i) Steve Collins, an early engineer hired by Wellfleet in 1987: conversation regarding network management design on May 15, 2016.

ii) Computer scientist Dr. Marshall Kirk McKusick, who worked on the 4.2BSD file system while at the University of California at Berkeley: conversation regarding Network filesystem (NFS) and CLI development on May 24, 2016.

iii) Software systems engineer Marten Terpstra, an employee of Wellfleet/Bay Networks/Nortel Networks/Avaya from 1995-2014: conversation regarding the design of the Bay Networks CLI implemented by Bay in 1996-1997 on May 25, 2016.

iv) Ocean Tomo staff, including Cate Elsten—Managing Director, Nick Baciu—Director, and Calvin Sy—Associate: conversation about industry market share analysis on May 27, 2016.

v) Computer Science professor Dr. John Black, University of Colorado at Boulder: conversation about CLI comparative analysis on May 31, 2016.

32. Regarding my anticipated trial testimony in this action, I may use as exhibits various documents or other materials relevant to the issues addressed in this report. I also reserve the right to use demonstrative exhibits, enlargements of actual exhibits, animation and any other kind of information in order to convey my opinions. I reserve the right to supplement my report, for example, if additional information becomes available.

V. THE RISE OF THE COMPUTER NETWORKING INDUSTRY AND INDUSTRY STANDARDS

A. Computer networking reinforced the need to share technologies openly and to allow vendors to coalesce around *de jure* (official) and *de facto* standards.

33. An industry standard prescribes a set of product characteristics that are widely adopted by either all or a significant portion of a given industry. In the networking industry, most standards exist to guarantee multi-vendor interoperability of a particular category of product. Some of these standards are created and ratified by formal standards organizations; some are standards that are created by one vendor and openly published so that others may

employ them in the design of their own products. Finally, many industry standards in the networking industry reflect customer preferences. Customers want their products to be compatible with one another for a variety of reasons, and vendors eventually settle on many common features to satisfy their customers.

34. As "internetworking"—defined as networks of networks—evolved from the U.S. Defense Department's ARPANET into the public Internet, more diverse networking products needed to communicate with one another. Network engineers needed to install, manage and configure an increasingly wide array of devices. These events led the industry to adopt a common set of protocols for the Internet (e.g., TCP/IP, BGP) and common methods by which to control and manage the network devices (e.g., SNMP, Cisco CLI).

35. Today, industry standards drive the modern networking industry. Networking standards make it possible to send an email from a Samsung Galaxy smartphone to an HP desktop computer running Windows 7, or share a wireless Canon printer between MacBook and Dell laptops, or browse the World Wide Web with an iPad. The emergence of TCP/IP as the dominant networking standard in the 1990's has made all of this possible. Today's Internet was made possible through the adoption of standards, building upon the work of the pioneers of the ARPAnet and Ethernet.

36. Standards that are defined and published by a vendor such as Digital are called vendor ***proprietary*** standards. Proprietary standards are developed to ensure that products developed by internal groups or third-party vendors will function properly in a system. This means that they are documented as formal engineering specifications, under ECO (engineering change order) control, and published for the benefit of third-party vendors who use the standard in the design of their own products. An example of a proprietary standard would be the DECnet

protocols, or the Q-bus, the electrical interface for LSI-11 compatible devices, memories, disk drives, etc.

37. Standards defined by recognized standards-setting organizations, such as the IETF, or the Institute of Electrical and Electronics Engineers (IEEE) are known as ***de jure*** standards. An example of a *de jure* standard is "IEEE 802.11™ Wireless LANs" used for wireless communications within a building or campus environment.

38. A ***de facto*** standard is one that is neither *proprietary* nor *de jure*, but one that typically emerges over time owing to its widespread adoption by users.

i) An example of a *de facto* standard is the original Ethernet standard developed by Digital, Intel, and Xerox, published in September 1980. It was widely implemented by a number of manufacturers and third-party vendors, including startups such as 3COM, Interlan, Excelan, Sun Microsystems, among many others.

ii) Another example of a *de facto* standard is the IBM Personal Computer, first introduced in 1981. The PC was a novel product for IBM, based on an open architecture, off-the-shelf hardware components and subassemblies, with its underlying software operating system, MS-DOS, from a little-known company at the time, Microsoft. Because the PC was sold to businesses and consumers through retailers at a very affordable price, and a large number of software vendors created products to run over MS-DOS, the IBM-PC design was copied by a number of other manufacturers. These PC-compatibles were termed "clones" to mean that they were practically identical to the original. They shared the same architecture, processor, peripheral bus, device drivers, etc. The exact same software could, usually, run on the IBM-PC and any of its clones. The same add-on accessories—hard drive, printer, scanner, mouse, network, etc.—could be purchased from third-party manufacturers and integrated into the PC or

its clone. This was an unusual characteristic of an IBM product, and it changed more than the personal computer market—it changed IBM.[3]

39. The organization responsible for creating the specifications of the Internet is the Internet Engineering Task Force (IETF). The IETF is unusual in its openness—it is open to anyone willing to devote time and energy to formulating the protocols, best practices, and implementations that are employed on the Internet. The openness of the Internet through the sharing facilitated by the IETF is often cited as one of the principal drivers of its growth and acceptance worldwide.[4]

40. The IETF held its first meeting in San Diego in 1986, and since then has been holding regular, open meetings with participants representing academia, government agencies, manufacturers, software vendors, and Internet users. The stated goal of the IETF has been "to make the Internet work better."[5] It has long recognized that in order to fulfill its mission, standards are necessary to achieve interoperability so that "multiple products implementing a standard are able to work together in order to deliver valuable functions to the Internet's users."[6]

41. One of the main reasons the Internet has grown so rapidly is the free and open access to basic documents, particularly protocol specifications. ARPANET and the Internet were born within the government and university research community, which embraces open publications of ideas and results. Early in the design of the ARPAnet, Requests for Comments (RFCs), provided the vehicle for information sharing among network researchers. As the "Brief History of the Internet," authored by several individuals involved in the design of the Internet, noted:

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[3] "The birth of the IBM PC," IBM Archives.

[4] https://www.ietf.org/blog/2016/01/30-years-of-engineering-the-internet/.

[5] http://www.ietf.org/rfc/rfc3935.txt.

[6] http://www.ietf.org/rfc/rfc3935.txt.

> The effect of the RFCs was to create a positive feedback loop, with ideas or proposals presented in one RFC triggering another RFC with additional ideas, and so on. When some consensus (or a least a consistent set of ideas) had come together a specification document would be prepared. Such a specification would then be used as the base for implementations by the various research teams.
>
> Over time, the RFCs have become more focused on protocol standards (the "official" specifications), though there are still informational RFCs that describe alternate approaches, or provide background information on protocols and engineering issues. The RFCs are now viewed as the "documents of record" in the Internet engineering and standards community.[7]

42. Cisco's own roots are in Stanford University's efforts to build a university-wide network.[8] Early Cisco promotional documents explain that Cisco was founded based on the belief in "large-scale networks and in public standards that would allow these networks to link many types of computers." Cisco co-founders Len Bosack and Sandy Lerner were employed by Stanford University and believed that the company's early success was attributable to demand for network products that were based on industry standards.[9]

43. Cisco recognizes that companies must cooperate to create a networking marketplace which offers customers a wide array of innovative products with which to create robust networks to connect users with applications and services.[10] Executive chairman John Chambers described Cisco as an "open standard company" noting that when Cisco moved into telepresence, it made it an "industry standard" available to others. Cisco has benefited from this approach because it allows Cisco to "move in markets faster" and protects its customers from

[7] "Brief History of the Internet," Leiner, Cerf et al, Internet Society, 2009.
[8] http://www.networkworld.com/article/2309917/lan-wan/lan-wan-router-man.html.
[9] Cisco Systems Inc. Company Backgrounder, March 1990 [Satz Dep. Ex. 407].
[10] CSI-CLI-03316935 (Soni Jiadani, OPEN: A Fundamental Part of the Network of the Future, *Cisco Blogs*, Nov. 6, 2014) (CSI-CLI-03316935).

getting locked in.[11] Cisco actively participates in OpenStack, Open Daylight, Open Daylight, Open vSwitch, and contributes to the network standards work of the IETF.[12]

B. With the advent of computer networking came an emphasis on interoperability and the rise of *de facto* standards in product development.

44. Today's Internet evolved from the ARPAnet, a creation of the Department of Defense Advanced Research Projects Agency, designed and deployed by Bolt, Beranek, and Newman (BBN) in 1969.[13] ARPAnet initially connected a handful of geographically distributed computer systems through the use of specialized communications processors, called Interface Message Processors (IMPs). The IMP was the predecessor of the modern-day Internet router. Each IMP was connected to a computer system at an ARPAnet site, with the IMPs being connected to one another over 56kbps leased digital circuits. BBN wrote the software for the IMP, which was based on Honeywell DDP-316 minicomputers, that implemented the communications method termed "packet switching." This involved the IMP receiving up to 8k bits of information from its connected computer, dividing into 1k or fewer bits (a "packet"), attaching a header containing the source and destination addresses of the communicating computer systems, and forwarding it to the next IMP. Each IMP was responsible for determining the transmission path required to reach each addressable computer system, and forwarding packets along those paths. Any connected computer could reliably communicate with any other without having to be concerned with the details of the location or the path (a.k.a. "route") required for each message to take. Since the days of the original ARPAnet, the "rules of the road" (network protocols) computer communications over a network of networks—the

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[11] CSI-CLI-03316935 (Cisco's John Chambers answers his critics: What premium pricing?, *Network World* March 12, 2010) (ARISTANDCA00287102).

[12] CSI-CLI-03316935 (Soni Jiadani, OPEN: A Fundamental Part of the Network of the Future, *Cisco Blogs*, Nov. 6, 2014).

[13] "Computer Networks," Tannebaum, A., Wetherall, D., pgs 56-57, 2001 (fifth edition), Prentice-Hall.

Internet—have gone through several iterations, requiring thousands or hundreds of thousands of hours of engineering time to revise and update implementations.

45. Early in the evolution of computer networking, each computer vendor designed its own proprietary, closed network architecture that described how its computers were to be connected to one another and to shared resources such as printers, scanners, interactive terminals, disk storage, etc. The creation of the IETF in 1986 gave communications engineers from a variety of organizations a neutral forum in which they could exchange ideas and experiences. This represented a sharp departure from the vendor-proprietary products, protocols, systems and software that was the industry norm—IBM's SNA, Digital Equipment's DECnet, Prime Computer's PRIMEnet, Wang Computer's WangNet being representative examples. Vendor-specific, "islands of distributed computing" could be found in most large corporations, and in many cases, represented a growing market for third-party vendors including startup companies focused on providing an alternative to the computer vendors' closed architectures. These third party vendors, such as Ungermann-Bass, 3COM, Interlan, Micom Systems, Bridge Communications, and others offered a set of products designed for a "multi-vendor" environment that was based on interoperability and an "open architecture."

46. Meanwhile, ARPA had decided to supply to the University of California, Berkeley, the source code for the most recent version of the IMP that was based on the Digital LSI-11/2 product line as implemented by BBN in 1982.[14] This software implemented a new protocol for the ARPAnet called TCP/IP, which was designed to provide reliable end-to-end delivery of computer communications over arbitrary distances within a bounded number of router hops.

[14] I was employed by the LSI-11 Product Group at Digital between July 1979 and May 1981.

47. The University of California, Berkeley, incorporated the BBN-authored TCP/IP protocol software into its design of Berkeley's version of UNIX, called 4.2BSD (version 4.2 of the Berkeley Software Distribution), in 1983. The 4.2BSD distribution was an early example of what is now known as "open source software" in that the University of California provided a notice that machine-readable copies of 4.2BSD software could be freely distributed by vendors.[15] As a consequence, the 4.2BSD software was readily adopted by several workstation vendors, academics, and commercial users of the UNIX operating system. Just eighteen months after being released, more than 1,000 site licenses had been issued. Some estimates provide that more copies of 4.2BSD had been shipped than of all the previous Berkeley software distributions combined.[16]

48. Digital's VAX computer was the hardware platform for the development of 4.2BSD, while variants of 4.2BSD UNIX were incorporated into the design of and released for several engineering workstation computing platforms including Sun Microsystems' workstations, NEXT, Masscomp, and Digital's Ultrix. The 4.2BSD software offered these vendors a ready-built, networked platform on which to base their applications that were focused on engineering users—CAD/CAM, software development, real-time process control, etc.

49. A consequence of the widespread adoption of 4.2BSD was that TCP/IP became the protocol standard for many computer installations, particularly within universities and government research facilities. UNIX was a popular operating system with university computer science departments, so adding TCP/IP networking to UNIX allowed many more universities to gain access to the ARPAnet. This was particularly important for university researchers, and

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[15] McKusick telephone conversation, 24 May 2016.
[16] http://www.oreilly.com/openbook/opensources/book/kirkmck.html.

served to advance the development of additional network protocols and applications through this new method of collaboration via the ARPAnet.

50. In 1980, TCP/IP was adopted as a Department of Defense (DoD) standard.[17] The ARPAnet switched to TCP/IP from the original protocol called NCP in January 1983. Access to the ARPAnet was restricted to DoD sites and contractors. This restriction was lifted several years later when the DoD created the MILNET for military use, subcontracting out the operation of the remaining network segments to commercial operators, which in turn led to the evolution of today's Internet.[18]

51. Starting in 1985, TCP/IP became mandatory for the National Science Foundation's NSFnet program.[19] By the early 1980s, dozens of vendors began incorporating TCP/IP into their products as well.[20] And in 1985, approximately 250 vendor representatives attended a three-day workshop on how TCP/IP worked.[21] This allowed many more universities to connect their computing facilities to the ARPAnet, which was still restricting its use to noncommercial users or government contractors. By 1990, Cisco itself referred to TCP/IP as "today's de facto standard protocol for internetworking."[22]

52. In effect, the 4.2BSD version of UNIX, and with it, TCP/IP, became *de facto* standards for the computer industry and served as a primary driver in the creation of the Internet of today.[23]

53. Since 4.2BSD contained a number of networking applications based on TCP/IP, several applications useful for network management and control were created with its release:

[17] http://bnrg.eecs.berkeley.edu/~randy/Courses/CS294.S13/1.1x.pdf.
[18] "Brief History of the Internet," Leiner, Cerf et al, Internet Society, 2009.
[19] http://bnrg.eecs.berkeley.edu/~randy/Courses/CS294.S13/1.1x.pdf.
[20] http://bnrg.eecs.berkeley.edu/~randy/Courses/CS294.S13/1.1x.pdf.
[21] http://bnrg.eecs.berkeley.edu/~randy/Courses/CS294.S13/1.1x.pdf.
[22] Cisco Systems Inc. Company Backgrounder., March 1990 [Satz Dep. Ex. 407].
[23] "Brief History of the Internet," Leiner, Cerf et al, Internet Society, 2009.

route, telnet, traceroute, netstat, ping.[24] These applications utilized the TCP/IP protocols layered underneath, and so offered developers the rudimentary tools that would permit the development of more application protocols. Development of other application protocols continued to be layered over the 4.2BSD version of UNIX, including: NFS (Network File System), DNS (Distributed Name Server), SIP (Session Initiation Protocol) among others, most of which have proven their durability and are in widespread use today.

54. Sun Microsystems concluded in the mid-1980's that it could be in its best interest to get workstation computer vendors to coalesce around one networked file system standard. At the time, network file systems were proprietary creations of some of the leading engineering workstation vendors, and were therefore incompatible with one another. This meant customers would get "locked in" to a specific manufacturer and be required to purchase additional computers or upgrades from one supplier. This "barrier to entry" needed to be overcome in Sun's perspective so that its workstation products would have access to a larger market. Sun chose to release the relevant specifications for others to incorporate into their products, or for more sophisticated customers to do so for themselves. This led to "connect-a-thons" held by Sun with the participation of several vendors to test the reliability and performance of each company's implementation of NFS in a multi-vendor environment. Thus, without obtaining any official standards body adoption, NFS became the industry standard for file systems, allowing Sun to broaden the availability of NFS, while also allowing other competitors to provide competing implementations based upon NFS.[25] NFS was later published by the IETF in RFC

[24] "Unix, Linux, and BSD: Command Line Cross-Reference," Marsh, N., FatFreePublishing.com, 2009.
[25] McKusick telephone conversation, 24 May 2016; Kirk McKusick email to Stephen X. Nahm, Subject: Sun RPC in BSD, Fri, 19 May 1989; Stephen X. Nahm email to Kirk McKusick, Subject: Sun RPC in BSD, 19 May 1989, Dennis Freeman email to general sun listserv, Subject: ONC/NFS Update, 19 Apr 1991.

1094, "NFS: Network File System Protocol Specification." It has since been the subject of later RFCs, which describe later versions of NFS.[26]

55. Applications developed on the 4.2BSD version of UNIX have proven critical in the growth, operation, and maintenance of the Internet. A typical university ARPAnet site would assign one or more Digital VAX computers running 4.2BSD the task of routing between multiple Ethernets, providing access to the ARPAnet to more of the site's computers. That required a few software tools to configure, monitor, and control the operation of the 4.2BSD system acting as a router. Some of these tools included: *ifconfig, route, traceroute, hostname, netstat*.[27] As more and more networks were added to a site, however, using a 4.2BSD VAX computer proved to be a performance barrier, so universities were among the first to adopt dedicated hardware routers, including those from Cisco.

56. Many of these 4.2BSD applications found their way into routers, including those from Cisco. The Cisco router replaced the VAX computer that previously performed the routing functionality. Network engineers responsible for the operation of the computer network were already accustomed to using the 4.2BSD network commands, and so they wanted the new dedicated router hardware to provide them with the tools with which they were already familiar. Vendors like Cisco, Cabletron, Bridge Communication, Ungermann-Bass and many others began to incorporate the BSD network commands into their products.

57. Each and every device attached to a network must implement the same protocol standards to permit communications with any other device. One of the peculiarities that occurred with the widespread adoption of Ethernet was that different network protocol standards could coexist on the same Ethernet physical infrastructure. For example, several Digital

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[26] *See*, *e.g.*, RFC 3530 (2003), Network File System (NFS) version 4 protocol.
[27] "Unix, Linux, and BSD: Command Line Cross-Reference," Marsh, N., FatFreePublishing.com, 2009.

computers (TOPS-20, VAX/VMS, PDP-11s, LSI-11s) could be connected to an Ethernet and could communicate with one another using the DECnet protocol software supplied by Digital. At the same time, other Digital VAX computers, Sun workstations, and other systems running 4.2BSD could communicate with each other using the applications compatible with the TCP/IP protocol software supplied in 4.2BSD. *But the DECnet-compatible computers could not communicate with the TCP/IP-compatible computers.* This phenomenon was sometimes referred to as "ships in the night"—traffic passing each other over the same Ethernet without knowledge of the other protocols that might be present. Typically, after installing an Ethernet within a building and attaching all of the computers that wished to use it, there might be three or more protocols in use—TCP/IP, DECnet, and LAT (Digital's Local Area Terminal). It was this problem that I found difficult to solve while I was at Interlan. Wellfleet Communications was the first vendor to address this problem of being able to *route* the protocols for which there was a defined *network layer* while being able to *bridge* (we would now say *switch*) protocols like LAT that lacked a defined network layer.

VI. GROWTH OF THE CLI AS A STANDARD INTERFACE FOR CONTROLLING NETWORK DEVICES

58. Dedicated router hardware began to assume the responsibility for the interconnection of networks within many facilities in the mid-1980s. Universities connected to the ARPAnet were among the early adopters of router technology from companies like Cisco. The universities on the ARPAnet employed network engineers who were already familiar with routing technology running on some computer systems that were connected to multiple networks. These university engineers were trained in the network commands that evolved with 4BSD UNIX.[28]

[28] "4BSD" refers to 4.2BSD and later versions.

59. Routing within a typical ARPAnet site began as a task for a 4BSD computer to perform. Several applications were written as commands that would run on these 4BSD computer systems. Examples of these identified earlier in this report include: *ifconfig, netstat, ping, route, traceroute*. Engineers responsible for the operation of the computer network grew accustomed to the use of these software tools and were familiar with their syntax, semantics, keywords, etc.

60. A CLI is designed with specific keywords and grammar such that humans can easily learn how to issue specific commands to a specific device affecting one or more of its control attributes. Early on, other manufacturers of routers implemented their own CLI design for configuration and control.

61. As an employee of Digital from 1979-1981, I had direct knowledge of the company's internal standards for languages, including the Digital Command Language, DCL. DCL was the Digital standard for all products that contained a command line interface. This included operating systems, such as VAX/VMS, TOPS-20, RT-11 and others, as well as applications that employed DECnet or the ARPAnet. I created a software product, the LSI-11 Remote Debugger, that contained a CLI which conformed to the DCL specification.

62. Before and while I was employed by Digital, I attended the annual meeting of DECUS, the Digital Equipment Corporation User Society. DECUS had several hundred members from around the world who were active in providing advice and feedback to the company's management about new products, customer service issues, and product improvements. For Digital customers who had purchased several models of Digital computers (e.g., VAX/VMS, PDP-11/60, LSI-11/2 such as ones I had purchased at Los Alamos Scientific Laboratory in the late 70's), learning a different CLI for each of Digital's wide array of operating

systems was a productivity drain. The announcement of the availability of a common command language, DCL, for VMS, RSX-11M, RT-11, RSTS, TOPS-20, etc. was met with enthusiasm by DECUS members.

63. Many aspects of the Cisco CLI are very similar to those defined by Digital's DCL.[29] Some of Cisco's keywords are found in even earlier products, such as the Proteon p4200 Gateway. A review of the user manuals from Cisco, Digital, and Proteon from the late-80s/early-90s illustrate commonalities in command structure, hierarchies, keywords, argument lists, etc., particularly with respect to Digital.[30] This is not surprising given that, for example, Digital's TOPS-20 operating system was the operating system on which the original Cisco router software was developed for the Stanford University Network,[31] The Tops-20 command was issued to connect a terminal to a remote computer system over the ARPAnet is an example of the use of a telnet syntax and English words long before the advent of Cisco's CLI. It would have looked like the following in 1983:[32]

@TELNET CONNECT DEC-MARLBORO
Trying...Open
Market - LCG'S Timesharing System, TOPS-20 Monitor 5.3(5000)
@

Digital's TOPS-20 operating system also supported the execution of multiple commands that might be stored in a file, then run at a later time. Groups of such commands, referred to as "command scripts," allowed for restoring connections following a power outage, for example.[33] Routers typically support command scripts to the present day.

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[29] TOPS-20 Commands Reference Manual, Digital, September, 1985.
[30] "Proteon Series p4200 Gateway Software User's Manual," Proteon, Inc., March, 1988; "Gateway System Manual," cisco Systems, July, 1988.
[31] http://www.networkworld.com/article/2309917/lan-wan/lan-wan-router-man.html.
[32] "TOPS-20 ARPAnet User Utilities Guide," Digital Equipment Corporation, October, 1983.
[33] "TOPS-20 Commands Reference Manual," Digital Equipment Corporation, September, 1985.

64. Digital's later products, such as the DECServer 100 Terminal Server,[34] delivered in 1985, had a command line interface for a different class of network device. A terminal server typically connected several interactive terminals to an Ethernet shared with potentially more than one computer system. In a large office, several terminal servers would enable any terminal user to access any of the connected computers through the terminal server's CLI. For the DECServer 100, to connect to the computer named "Sales" one would type in response to the "Local>" prompt from the DECServer 100:

Local> CONNECT SALES
Password:

To show the state of the connections to one or more computers, the command line would look like:

Local> SHOW SESSIONS ALL
<list session state information>

65. Digital's DECnet architecture was implemented on several of Digital's operating systems, e.g., RT-11, RSX-11M, VAX/VMS, TOPS-20.[35] This allowed Digital's customers to connect any Digital computer to an Ethernet and be able to share files, printers, execute remote applications, etc. Each computer running DECnet would have a Network Control Program (NCP) that gave a network engineer the ability to configure, examine, and alter various parameters that affected the behavior of the computer and its connection to the network. NCP provided a CLI for the network engineer to interact with the DECnet software. Among the commands implemented by NCP were "CLEAR," "HELP," and "SHOW."[36] Various versions of NCP were released by Digital, beginning in the early 1980's with the release of VAX/VMS.

[34] "DECServer 100 Terminal Server Operations Guide," Digital Equipment Corporation, January, 1985.
[35] "DECServer 100 Terminal Server Operations Guide," Digital Equipment Corporation, January, 1985.
[36] Arista's 6th Supplemental Response to Cisco's 1st Set of Interrogatories, pages 144-145.

66. The following example illustrates use of the CLI in the Proteon Series p4200 Gateway from 1988[37] [note: the term for a "gateway" was employed to mean "router" by most manufacturers in the 1980s]:

```
NCP>show adjacent nodes status
Adjacent Node Volatile Status

Executor node                = 2.26  (gato)

State                        = on
Physical address         = AA-00-04-00-1A-08
Type                         = area

Node    State        Type           Cost   Hops   Circuit   Next
Addr                                                        Node

2.14    reachable    routing IV      3      1      Eth/0    2.14
2.34    reachable    routing IV      2      1      Pro/0    2.34
2.42    reachable    nonrouting IV   2      1      Pro/0    2.42
1.22    reachable    area            3      1      Eth/0    1.22
```

Note the use of a "show" command followed by multiple keywords within one command as implemented by the Proteon CLI.

67. As previously mentioned, once an Ethernet was deployed and made operational in a customer location, it would not be unusual to have three or more protocols running over the same Ethernet, each supporting a separate group of computing systems and associated devices. The effect of this "ships in the night" phenomenon was to introduce additional operational complexity on the network engineers assigned to keep everything working properly. Furthermore, connecting multiple Ethernets together, often times over distance, through the use of multi-protocol routers from Wellfleet or Cisco meant that the network engineers had to be able to configure and control the routers to forward (or not) the appropriate protocol-specific traffic, potentially over different paths. This further complicated the operation of the resulting

[37] "Proteon Series p4200 Gateway Software User's Manual," Proteon, Inc., March, 1988.

enterprise network by introducing the need for fine-grained controls over the network traffic that many times had to be compartmentalized according to protocol type.

68. Vendors responded to this complexity in different ways. An illustrative example is the difference between Wellfleet and Cisco's different approaches.

i) According to the contractor who wrote Cisco's command line interface parser, Cisco's first products did not initially implement a true command line interface.[38] The CLI was added in the early 1990s to allow the line editing of commands.[39] The design of a CLI for a network device is based on the "interactive computing" model—a teletype-like terminal device that sends alphanumeric characters over a communication link to a computer, which in turn provides alphanumeric responses. In Cisco's case, the role of the computer is served by software in the router which interprets the commands sent from the terminal and generates replies. Given the limited number of characters that could be displayed on a single command line (generally <80), the nature of the commands and the types of information that could be displayed on the terminal necessitated that each command be limited in its scope and impact. Configuration of a Cisco router required the network engineer to type in several lines of commands, insuring the router's response to each one judged to be acceptable. Engineers stereotypically enjoy complex interactions with machines, and network engineers are no exception in my experience. However, this approach is prone to human error as simple typing mistakes, such as transposition of digits in specifying a network address (e.g.,"I typed 172.0.0.1 but I *meant* to type 172.0.1.0!") could render the router inoperable. Nonetheless, the Cisco CLI design caught on with many network engineers, particularly in academia, and consequently served as a graduate student's

[38] ARISTANDCA00265185 ("The history of the Cisco CLI," Slattery, T., CCIE Flyer, February, 2009).
[39] *Id*.

first exposure to computer networks, routers, switches, network design, configuration, and debugging.[40]

ii) Wellfleet decided to leverage a relatively recently defined RFC, called the Simple Network Management Protocol (SNMP). Although clearly intended for the management of TCP/IP networks, SNMP could easily be extended to accommodate other protocol stacks (DECnet, XNS, Novell, etc). We (I was the company's Chief Technology Officer at the time) concluded that Wellfleet would address the complexities of operating a multi-vendor, multi-protocol network by providing a graphical interface that would allow for the logical separation of each protocol family and the associated computers and devices. Through the use of color graphics on a centralized management workstation, we sought to simplify the complexities inherent in the operation of multi-protocol networks. For more localized, fine-grained control of each router, we decided to implement a "technician interface," a greatly simplified set of commands and controls accessible through a local terminal or PC terminal emulation software. The idea was to present the primary means of man-machine interaction through a graphics interface (GUI) on a centralized PC or workstation, while providing a simpler technician-level CLI for local control.

iii) From Wellfleet's perspective, Cisco presented a "bottoms-up" view of the network, starting with the information available within each router. Our vision was to present a Wellfleet customer with a "top-down" view of the network, peeling back the protocol-specific layers to offer a successively more comprehensive view of the underlying network and its behavior. In contrast, each Cisco router could provide information about each protocol or device, one at a time, leaving the integration of appropriate information to the network engineer.

[40] McKusick telephone conversation, May 24, 2016.

Of course, over time, Cisco did introduce a workstation-based network management product, but at the time [1990], we only knew of Cisco's CLI implemented in each router.

69. By the early 1990's, many network devices from a number of vendors were controlled through a CLI. One motivation was that most users were running their business or engineering applications on a PC or workstation, relegating their character-only (i.e., no graphics capability) video "dumb" terminals to network or system management tasks. Furthermore, a CLI represents the simplest, lowest-common-denominator of man-machine interfaces for general purpose computers or for computers embedded within network devices such as routers and switches. A CLI can be implemented in a relatively modest amount of code; is generally "table-driven" so that new commands or keywords can be easily added, modified, or deleted later by simply editing the table; and, they can (and do) use common English words so that they can be intuitive and easily remembered.

70. This history of CLI development conclusively shows that:

i) Cisco did not invent the CLI;

ii) Cisco was not the first to employ common English keywords (e.g., SHOW, CLEAR, HELP), in their CLI design;

iii) Cisco was not the first to design a CLI employing multiple keywords;

iv) Cisco has implemented within its CLI common industry terms (e.g., "ip route") or acronyms (e.g., "aaa" for authorization, authentication, accounting) as keywords;

v) Cisco was not the first vendor to implement a CLI in a router or other network equipment;

vi) Cisco's CLI design evolved from other works that preceded and influenced its development, including that of Digital, Proteon, and UNIX (particularly 4BSD).

VII. CISCO'S DEVELOPMENT AND PROMOTION OF A *DE FACTO* STANDARD CLI

71. Cisco held over 50% of the router market in the early 1990s, so Cisco's customers held a great deal of influence over the other router vendors, including Wellfleet.[41] The networks that all of our customers were installing were growing larger and larger, becoming far more complex in the process. Networking was still new to many operators of computer systems, and there was a real lack of knowledge in how the protocols worked, troubleshooting and problem resolution, and proper installation and configuration. It typically fell to each vendor to provide customer training on these issues, to create a new specialty of "network engineer." Having a common human interface in every communication device, switch or router, simplified the operation of the network for every customer in most every respect. The increasing complexity of these networks drove many customers to demand that Cisco's competitors adopt some of the same command and control features in their own products. This included the commands implemented by each vendor's CLI. It was up to the other vendors to figure out a way to adopt the Cisco CLI for their own products.

72. The emergence of the Cisco Certified Internet Expert (CCIE) (and related certifications for the vast number of network administrators managing networks dominated by Cisco equipment of all sorts) as an educational requirement for many IT professionals drove other networking vendors to emulate the Cisco CLI to remain competitive in the marketplace.[42]

[41] Redacted Cato Dep. Tr. at 83. "Q. (By Ms. McCloskey) You referred just a moment ago to- Cisco's market share. Is it fair to say that because of Cisco's market share very frequently . . . customers have experience on Cisco switches? [. . .] And they want to be able to apply that experience to the use of Dell's switches? [. . .] THE DEPONENT: My understanding is yes."; Redacted Birnbaum Dep. Tr. at 101:25-102:2-7 "Q. What is a de facto industry standard for CLI? A. I think it's the one that most people are familiar with and most people use and let's be clear, Cisco is the dominant player in the switching and routing network market and therefore, it is the de facto standard for CLIs."

[42] http://www.networkworld.com/article/2349126/cisco-subnet/appealing-to-ccies--hardware-vendors-copy-cisco-s-cli-and-netflow-to-get-into-cisco-acc.html; ARISTANDCA00265185 ("The history of the Cisco CLI," Slattery, T., CCIE Flyer, February, 2009.)

The dynamic of Cisco-trained experts operating customer networks, influencing the decisions of their employers or clients as to what additional networking equipment to purchase, in turn led to a cycle reinforcing the desirability of continuing to purchase Cisco-compatible network equipment. While this has allowed some other market participants apart from Cisco to serve this need, for the most part it has served to reinforce Cisco's market share dominance.[43]

73. Cisco and Cisco's competitors have long been aware that their customers have been investing heavily in training their network engineers on Cisco's CLI.[44] Because very few networks lack *any* Cisco equipment, essentially all senior networking engineers who operate complex network infrastructures must be trained in the industry-standard CLI, and many are CCIE-certified.[45] CCIE training can cost tens of thousands of dollars and months of preparation. There is a whole cottage industry selling test prep materials and courses to aspiring network engineers. Applicants must pass a two-hour routing and switching written exam, followed by an eight-hour lab exam.[46]

74. A common CLI has the effect of maximizing customer training investments, while allowing Cisco to project an image of leadership, continuity, and consistency in networking. Cisco recognized that customers want to choose the vendor that is best-suited to their needs, without having to retrain its engineers.[47] Network engineers monitoring or configuring network equipment from multiple vendors benefit from a common CLI—the

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[43] An analogy here is the IBM PC market. IBM allowed many other vendors to replicate its PC, which served the very useful purpose to IBM of establishing the IBM PC as the de facto standard for personal computing. *See* "The birth of the IBM PC," IBM Archives.

[44] ANI-ITC-944_945-1144219 (United States Patent No. 7,953,886 B2, May 31, 2011); *see e.g.* Venkatraman Dep. Tr. at 96:12-22.

[45] *See* Berly Dep. Tr. at 177:10-12.

[46] http://www.networkworld.com/article/2347307/cisco-subnet/how-much-does-it-cost-to-become-a-ccie-.html; Redacted Birnbaum Dep. Tr. at., 105:12-21 "The CLI, the CLI because it had gone in to, you know, all the network operators in the world know this CLI. It is the standard. I mean I don't recall them saying industry specifically but it was I know the word standard was in there and it had to do with the fact that they have hundreds and thousands of operators around the world and they know the Cisco CLI."

[47] *See* Berly Dep. Tr. at 151:19-23, 152:2-20; Redacted Sadana Dep. Tr. (March. 17, 2016) at 109:1-4.

absence of which can lead to network failures due to misconfiguration caused by human error.[48] Cisco found it important to assure customers that its CLI was an "industry standard" and not proprietary to Cisco.

75. I note also that Cisco's choice of words—"industry standard"—is distinct from words one might choose to promote the fact that Cisco's CLI was superior to others. There is a fundamental difference between marketing a feature for the fact that it is well-established and in common with customer expectations ("industry standard") as opposed to marketing a feature for how it is a differentiator from the competition (e.g., "exclusive," "unique," "the best"). I am not aware that Cisco ever promoted its CLI as "unique," and it would make no sense for Cisco to use the term "industry standard" to convey the impression that its CLI was different or better than others. Likewise, it would make no sense for Cisco to use the term "industry standard" if its purpose was to convey the idea that CLI commands designed into one version of Cisco software were to be found in later versions, but uniquely Cisco's. If that were the goal, one would expect Cisco to refer to something like "Cisco standard" commands, just as Digital had done with its DCL command line standard. Cisco's marketing efforts avoided any suggestion of a purely Cisco environment, as opposed to an industry-wide, multi-vendor environment. In this way, Cisco chose a parallel path to that of the IBM PC, as opposed to the proprietary Apple Mac/iMac strategy.

76. By making its CLI an "industry standard," Cisco was assuring its customers (who may choose to dual-source their networking needs) that they would not attempt to cut off competition by asserting some proprietary rights in those commands. Cisco communicated to customers that even if they used Cisco equipment with other vendors' equipment their network engineers would not need to devote extensive time or resources to learning the system or

[48] *See* Berly Dep. Tr. at 183:1-8; 184:21-185:2.

becoming operationally proficient[49] by referring to its own CLI as "the standard for configuration in the networking industry."[50] Specifically, Cisco informed customers that "industry standard" CLI provided for "ease of provisioning"[51] and "end-to-end manageability.[52] According to Cisco, this also allowed customers to avoid the expense of high-level, on-site technical expertise.[53]

77. Cisco achieved another strategically important result—whether by design or not-by promoting the Cisco CLI as an "industry standard." Allowing the industry to coalesce around Cisco's CLI as a standard disincentivized the rest of the industry from developing its own, separate standard.[54] Why would the rest of the market participants—who themselves have a small fraction of market share compared to Cisco—try to develop some competing CLI standard so long as Cisco was allowing all others to use the most widely-adopted (Cisco) CLI? This phenomenon had important benefits for Cisco. Had the rest of the networking industry been successful in coalescing around some different CLI command standard, Cisco would have been seen as the "closed" and "proprietary" alternative, which was the antithesis of the entire "multi-vendor, open systems" philosophy that enveloped the networking industry. Alternatively, Cisco would have had to change its CLI commands to conform to the new "industry standard" which would likely have been extremely costly and disruptive to its customer base. By allowing the industry to adopt Cisco's own CLI as a standard, Cisco avoided both of these potentially threatening outcomes.

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[49] ARISTANDCA00009488; ARISTANDCA00009520; ARISTANDCA00009625; Berly Dep. Tr. at 141:7-25.
[50] ARISTANDCA00010595; *see also* Redacted Birnbaum Dep. Tr. at. 46:9-17, 104:4-10.
[51] ARISTANDCA00010484; ARISTANDCA00010489; ARISTANDCA00010491.
[52] ARISTANDCA13172860.
[53] ARISTANDCA00009527.
[54] I take no position with regard to what such an alternative standard would look like. It is difficult to imagine how any such set of commands for a given set of networking functions and protocols would not use many of the same command words Cisco has used.

78. Cisco was not only calling its CLI an "industry standard" to sell products; it actually believed it. First, Cisco also referred to its CLI as an "industry standard" internally.[55] Second, Cisco was well aware that other companies were using the same or similar CLI. One of its own patents filed in 2005 freely acknowledged that many companies aim to support Cisco's CLI in their routing systems.[56] Its product documentation has also acknowledged that most CLI-based devices sold by competitors use a CLI that resembles Cisco's.[57] Allowing other manufacturers to copy their CLI was another way of assuring Cisco's customers that they were purchasing network equipment entirely based on open systems standards. Given Cisco's market dominance and its tacit approval, many network equipment vendors engineered their CLIs to appear to copy Cisco's. Examples of companies that support some of the very modes, prompts, and commands that are at issue in this litigation include Adtran, Alcatel-Lucent, Allied Telesis, Avaya, Brocade Communications Systems, D-Link Corporation, Extreme, Dell, Foundry, HP, Juniper, Netgear, Nortel Networks, Procket Networks, and Redback.[58]

79. Customers were also pressuring more network vendors to copy the Cisco CLI.[59] Customer demand for a common and familiar interface available to engineers responsible for the operation of their networks created a situation that drove vendors for all network equipment to

[55] Berly Dep. Tr. at 143:4-5, 15-19; 145:3-9.

[56] ANI-ITC-944_945-1144219 (United States Patent No. 7,953,886 B2, May 31, 2011).

[57] CSI-CLI-04633845 (Tail-f Network Control System 3.3 Getting Started Guide, Nov. 24, 2014).

[58] Redacted Def. Arista Sixth. Supp. Responses to Pl.'s First Set of Interrogatories, Feb. 19, 2016; Redacted Cato Dep. Tr. at 65-66 "Q. (By Ms. McCloskey) Have you ever discussed with others the fact that the Dell CLI . . . supported by Dell shares commands in common with the CLI supported by Cisco? . . . A. For the industry standard, yes." *See also* ARISTANDCA12906635, "Force10 E-Series Architecture" datasheet.

[59] *See* Redacted Sadana Dep. Tr. (March 17, 2016) at 109:1-4 "All of our requirements were driven by customers. Majority of the customers required an industry familiar with CLI that they were trained to[.]"; [redacted]; Redacted Cato Dep. Tr. at 58-61. "Q. In what context have you heard to customers refer to industry standard CLI? A. We've heard it in terms of communication of requirements or communication of -- of their practices internally."; "Q. Do customers generally expect industry standard commands? [. . .] THE DEPONENT: In general, yes."

align their CLI with the rest of the industry—namely, Cisco's CLI.[60] A common CLI provides customers with some clear benefits: it reduces training and certification costs for network engineers; it provides the customer who may purchase one type of network device from only one vendor with the credible threat of replacing the product and therefore the supplier with an equivalent device from a different supplier; and, it improves the efficiency of additions, alterations, and troubleshooting in network operations across the customer's network.

80. The majority of vendors across the industry have adopted a CLI similar to Cisco's, which they actively market to customers who in turn have been conditioned to expect a familiar industry-standard CLI with non-Cisco products.

i) In touting the "ease of migration" and "leveraging existing knowledge," Hewlett Packard (HP) also cites its "industry standard CLI."[61] HP openly claims that almost all of its GbE2 series switch installations are "interworking in a Cisco environment."[62] Like Cisco, HP acknowledges that a familiar CLI "reduces training time and expenses, and increases productivity in multivendor installations,"[63] specifically by reducing training and certification costs.[64]

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[60] *See* Redacted Sadana Dep. Tr. (March 17, 2016) at 272:10-12 "Customers were saying they wanted the IOS-like CLI. It's very clear that was the barrier to entry for us from a CLI perspective and customers wanted a consistent approach."; Ullal Dep. Tr. at 214:7-11 "That industry standard words are deployed by Cisco and Cisco's competitors and Cisco's customers and are freely approved for use as -- as the mainstream language of communication between networking equipment."; *Id.* at 282:11-13 "When customers ask for a Cisco-like CLI that Cisco says is industry standard, it's industry standard.

[61] ARISTANDCA00224839.

[62] ARISTANDCA00224907.

[63] ARISTANDCA00224912.

[64] ARISTANDCA00225271.

ii) In promoting its switch products, Dell has explicitly cited its "Cisco-styled" or "industry standard" CLI.[65] Similar assurances have been provided by Blade Network Technologies,[66] Brocade,[67] Avaya,[68] and Hewlett-Packard,[69] and others.

iii) William T. Nelson, former Nortel Manager of Alteon Sustaining Engineering and Alteron Customer Projects and one of the founders for Blade Network Technologies ("Blade") attests to the development of the CLI at both companies. According to Nelson, in the late 1990s, Nortel responded to marketplace demand for a CLI that was familiar to users of CLI developed by Cisco, 3COM, and Extreme— while still particular to Nortel products— by developing and increase its use of and support for Nortel Networks Command Line Interface (NNCLI). In 2005, when Blade was spun off from Nortel, Blade renamed the NNCLI "industry standard CLI" or "ISCLI." This phrasing was chosen because the CLI had become accepted with the industry and familiar to engineers likely to be using Blade switches.[70]

81. Cisco itself has begun to offer a tool that uses other vendor CLI commands in order to seamlessly allow management of multi-vendor networks. More recently, the Cisco Network Service Orchestrator (NSO) software has been used by network engineers employed by service providers that are trained in Juniper's JUNOS CLI by abstracting the Juniper CLI from direct interaction, providing a programmatic interface to the network engineer, discussed in more detail below.

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[65] ARISTANDCA13172741, ARISTANDCA13172744, ARISTANDCA12906637.

[66] ARISTANDCA10056719; ARISTANDCA13682850.

[67] ARISTANDCA10778935; ARISTANDCA10792665.

[68] Top 10 reasons Avaya Networking and Wireless LAN should be selected for your IP Office Deployment, *available at* https://www.avaya.com/usa/documents/top-10-reasons-avaya-networking-and-wireless-lan-for-ip-office-dn7772.pdf; Avaya Virtual Services Platform 7000 Series Fundamentals, January 2013, *available at* https://downloads.avaya.com/css/P8/documents/100169443.

[69] ARISTANDCA00224908.

[70] William T. Nelson Declaration in Support of Blade Network Technologies, dated May 27, 2016.

82. To expand its presence in the service provider market, Cisco acquired a Swedish software company, Tail-F Systems, in 2014[71] to allow Cisco to configure and manage—"orchestrate"—other vendors' equipment and virtualized network functions (VNF). Service providers have been among the first to deploy VNF products to enable the creation of a Software Defined Network (SDN). Cisco NSO is the company's first offering in managing multi-vendor networks consisting of a mixture of network equipment, virtualized functions, and SDN controllers. This allows the service provider to define and deliver services to its customers. NSO automates the process of configuring the software and the devices to create the desired service.

83. For an NSO to function it must first be configured with the capabilities of each element comprising the service, including the equipment which is controlled through a CLI. The NSO software issues commands and configuration information to each network device through its CLI.[72] In other words, a Cisco software product contains all of the commands, keywords, and data structures for other vendors' CLI to permit service orchestration and delivery.

84. I understand Cisco has taken the position that the lawsuit it filed against Huawei demonstrates that Cisco did not treat its CLI as an industry standard, notwithstanding its statements to the contrary. First, that lawsuit occurred in January 2003,[73] and the statements by Cisco on which I rely and am aware all occurred well after that. But also, the public record of that case was focused on Huawei's use of Cisco source code. In particular, the preliminary injunction that was issued was based upon theft of trade secrets (i.e., source code), a claim that I understand Cisco has not asserted in this case.[74] I am aware of other companies around this time that used a CLI similar to Cisco's; indeed Procket Network's commands were intended to be

[71] "Why the Tail-F acquisition is a big win for Cisco," Kerravala, Z., Network World.
[72] ARISTANDCA13365226.
[73] CSI-CLI-01480509 (Huawei Complaint).
[74] CSI-ANI-0141529 at 1533-37. The Court noted that Cisco failed to "undertake th[e] analysis" to prove any right to preliminary relief regarding the claim in copyright in the CLI. *Id*. at 1533.

"bug compatible" with Cisco's,[75] yet I am not aware of any effort by Cisco in this time period to prevent Procket Networks from using similar CLI commands. Therefore the message to the industry surrounding the Huawei litigation was that Cisco would enforce its IP rights in its source code, but if all one did was use CLI commands, Cisco had no dispute with such conduct.

85. With the resources and competitive nature of a company such as Cisco, it would be shocking if they were not aware of many other companies, including Arista, using an IOS-like CLI.[76] It would be consistent with Cisco's interests and strategy to allow companies to use Cisco's CLI for purposes of establishing a broad common base of CLI knowledge that originated from Cisco, allowing Cisco to portray itself as a leader while also assuring its customers that they will not be locked in when they buy and deploy Cisco equipment.

VIII. THE EFFECT OF ARISTA'S USE OF ASSERTED ASPECTS OF THE CLI ON THE MARKET FOR CISCO IOS

86. As noted above, I have been asked to provide background regarding the market segments in which Arista competes, and to evaluate what, if any, effect Arista's use of the CLI features in which Cisco claims copyright may have had on the market for Cisco's asserted copyrighted works (which I understand to be various versions of Cisco's operating systems, including IOS and NX-OS, and associated documentation).

87. I understand that fair use is an affirmative defense against copyright infringement, meaning that if the use of copyrighted materials qualifies as fair use then there is no infringement. I have been told that one of the fair use factors is concerned with the effect upon the potential market or actual market for the copyrighted work. Along those lines, I understand that a presumption or inference of market harm only applies to verbatim copying of an original

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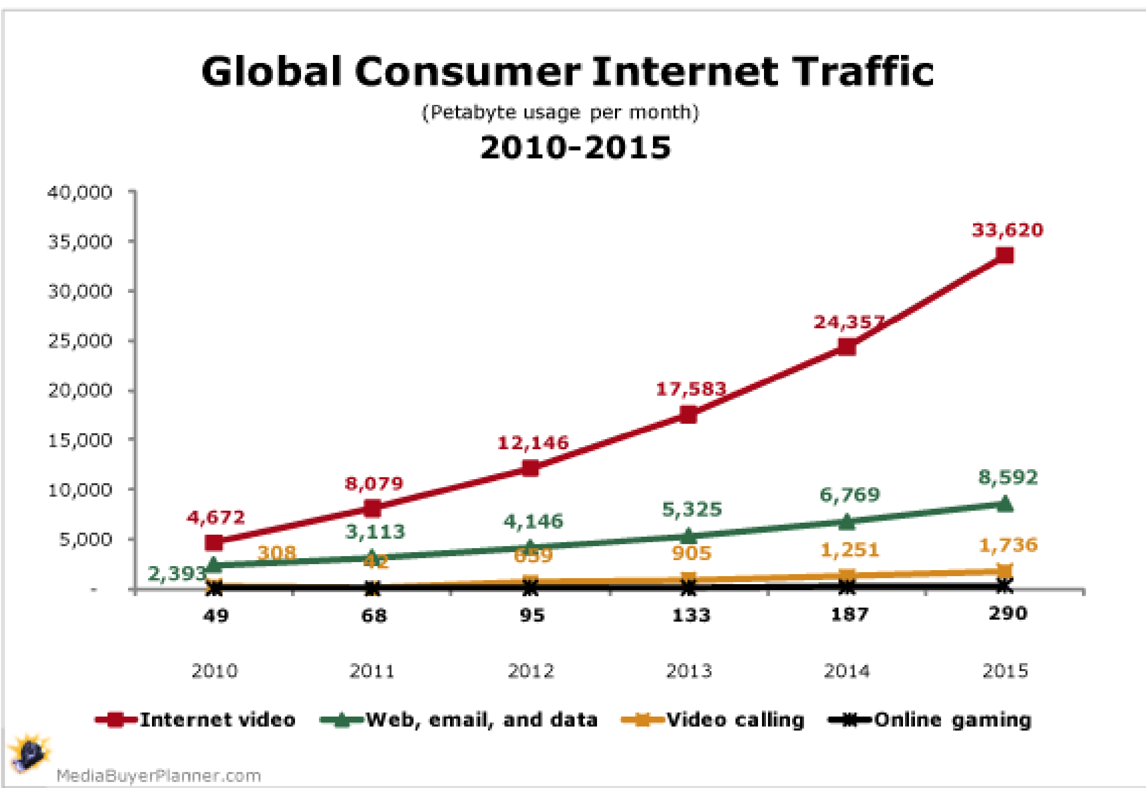
[75] *See* Li Dep. Tr. at 158:4-13.

[76] *See* Jiandani Dep. Ex. 607, Li Dep. Tr. at 76:4-6, 79:18-20, 158:20-22; 160:11-23; Berly Dep. Tr. at 143:4-5, 15-19; 145:3-9.

copyrighted work in its entirety for commercial purposes. In the case of a transformative use, market substitution is less certain, and market harm cannot be inferred.

A. The evolving market for Ethernet switching.

88. The Internet has evolved dramatically since the original ARPAnet. Today's Internet now carries large volumes of video and voice/audio content,[77] often destined for smartphones, tablets, laptop computers over wireless technologies such as LTE and WiFi in addition to the coaxial or fiber optic cables provided by the cable television providers. The confluence of virtualization of computing and networking with new services from companies like Facebook and Netflix has had a profound impact on the Internet's architecture. Increasingly, Internet services are provided in "the cloud," a reference to large data centers operated by companies such as Amazon, Google, Facebook, and others.



Source: Cisco

[77] "Global Consumer Internet Traffic 2010-2015," MediaBuyerPlanner.com, Cisco data (next page).

89. "The cloud" has emerged in recent years to augment or as a substitute for enterprise computing, networking, and storage resources with the consequent effect of shifting the bulk of the purchase of networking equipment from the enterprise to cloud providers who install them in remote data centers. Furthermore, the trend toward "virtualization" of data centers, including networking functions, has had the effect of reducing the number of routers required within a data center because some of the network traffic has been shifted onto commodity servers, each of which contains two or more Ethernet interface cards. In some ways, we have come full-circle from the ARPAnet days of using BSD VAX computers as routers to using Intel-based compute servers running virtual switching or routing software. Routing in this environment is deployed as another software-based "virtual machine" running on data center server hardware wherever and whenever it may be required.

90. Transferring an increasing amount of enterprise computing to the cloud combined with the software-based virtualized routing has resulted in a slowdown in spending for networking equipment within the enterprise. From the Dell'Oro Group's "Ethernet Switch - Data Center Quarterly Report 4Q15":

> We expect enterprise data center spending to weaken in 2016, declining Y/Y as economic weakness has caused enterprises to pull back on spending plans in 2016. Enterprises are also moving workloads to the Cloud in record volumes; we do not know whether this spending will ever come back or will permanently shift to the Cloud. Our current belief is that enterprise spending in the data center will have a modest rebound in 2017. But we believe the damage to the premises market will already have been done, marking 2015 as the year that spending in enterprise data centers peaked.[78]

91. Data centers are constructed with hundreds to thousands of compute, network, and storage servers housed in large buildings, often located in remote locations where electrical power is least expensive. Compute and storage servers are connected with modern-day Ethernet switches operating at speeds of 1-100Gbps, and are expected to increase to 400Gbps within the

[78] Dell'Oro Group's "Ethernet Switch - Data Center Quarterly Report 4Q15.

next decade.[79] These switches are networked in a hierarchical, redundant configuration to provide highly-reliable communication paths for the applications running in the data centers and for the devices accessing these applications located anywhere in the world. It is imperative that all elements of the network operate robustly to assure service availability year-round: 24 hours a day, seven days a week.

92. For some large data center operators, managing or controlling their network switches by means of a device CLI is increasingly rare. Facebook's data center recently built in Altoona, Pennsylvania, has been described on their engineering website as follows:

> A large fabric network—which has a more complex topology and a greater number of devices and interconnects – is definitely not the kind of environment that can be realistically configured and operated in a manual way. But the uniformity of the topology helps enable better programmability, and we can use software-based approaches to introduce more automation and more modularity to the network.
>
> To automate the fabric, we've adjusted our thinking to be more "top down"— holistic network logic first, then individual devices and components second—abstracting from individual platform specifics and operating with large numbers of similar components at once. We've made our tools capable of dealing with different fabric topologies and form factors, creating a modular solution that can adapt to different-size data centers.
>
> Also important was the disaggregation of hardware and automation—the fabric's forwarding plane is actually independent of our tooling and vice versa. This allows us to replace any specific components without principal changes to software, and makes a broader range of hardware platforms compatible with our tools. ***Configuration work happens at the fabric level – as opposed to the device level – using the minimum number of high-level settings needed to define the network, its building blocks, and routing logic*** (emphasis added). All specific addresses, routing policies, port maps, and vendor-agnostic component parameters are derived from these high-level settings, rendered into applicable platform-specific forms, and pushed to the boxes. For each individual platform, we only need to define a few simple actions and basic syntax templates.[80]

93. In 2010, the information technology news website, *Network World*, tested the switches of six vendors: Arista, Blade, Cisco, Dell, Extreme, and HP ProCurve. It assessed the

[79] "The Ethernet Roadmap Panel 2015," Kipp, S., Ethernet Alliance presentation, Mar 2015.

[80] https://code.facebook.com/posts/360346274145943/introducing-data-center-fabric-the-next-generation-facebook-data-center-network/.

following 10 areas: features; management and usability; power consumption; MAC address capacity; unicast and multicast throughput; unicast and multicast latency and jitter; link aggregation fairness; multicast group capacity; multicast join/leave delay; and forward pressure.[81]

94. After three months of "grueling" performance tests, *Network World* identified Arista's DCS-7124S and Blade's G8124 as its "top picks" due to their combinations of features and performance, particularly in the categories of latency and jitter. As to Cisco's Nexus 5010, *Network World* cited "high latency, usability gremlins and multicast leakage" as the reasons for its modest performance. Indeed, the subheadline of the story noted that the performance tests "exposed weaknesses" of Cisco's switches.[82]

95. Notably, all but one of the switches *Network World* tested has a Cisco-like CLI, which the industry website referred to as "a smart design choice considering more network engineers are conversant in IOS than any other environment."[83] However, the way each switch uses the CLI varies from one to another. For example, Arista's EOS runs on Linux, and—unlike other competitors—opens up Linux to users. In contrast, at the time of the *Network World* test, Cisco's Nexus 5010 had CLI running on the switch's NX OS. It was criticized for requiring users to execute four separate commands simply to download a configuration from a TFTP server. Moreover, in order to enable jumbo frame support, numerous policy-map and service-policy commands had to be entered.[84]

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[81] http://www.networkworld.com/article/2241564/ethernet-switch/how-we-tested-10gigabit-ethernet-switches.html.

[82] http://www.networkworld.com/article/2241525/virtualization/arista--blade-win-top-spot-in-data-center-switch-test.html.

[83] http://www.computerworld.com/article/2522844/networking/management-and-usability--extreme-goes-its-own-way.html.

[84] http://www.computerworld.com/article/2522844/networking/management-and-usability--extreme-goes-its-own-way.html.

96. More importantly, Arista's switches stand out in that they have the highest port count and throughput density, lowest latency, and are power efficient, particularly when compared to Cisco:[85]

	Cisco	Arista	Advantage
Ports/Rack	64-256	800 - 1920	3x - 8x
$/Port	$2000-$4,000	$400-$500	5-10x less
Throughput	25-50%	100%	2x - 4X
Latency	10s of µs/ms	1-3 µs	10x less
Scalability	40-80 G/slot	480G/slot/RU	10X more
Power/Port	50W	<10W	5x less

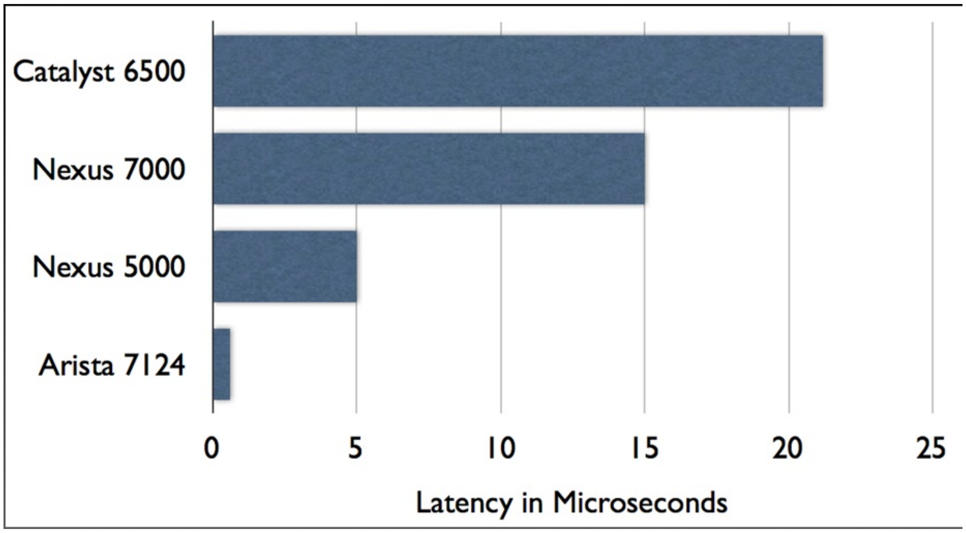
ARISTANDCA00268472

Latency and jitter are two of the most important performance metrics in certain data center applications such as financial trading, where speed translates to money.[86] Arista, and another competitor—Blade—delivered some of the lowest latencies in the industry, while Cisco switches delivered average to high latency. One Cisco switch with the lowest latencies—the Nexus 5010—still had more than four times the latency of Arista's switches.[87] Compared to three of Cisco's switches, Arista's 7124 reduces latency by more than half.

[85] ARISTANDCA00268471.

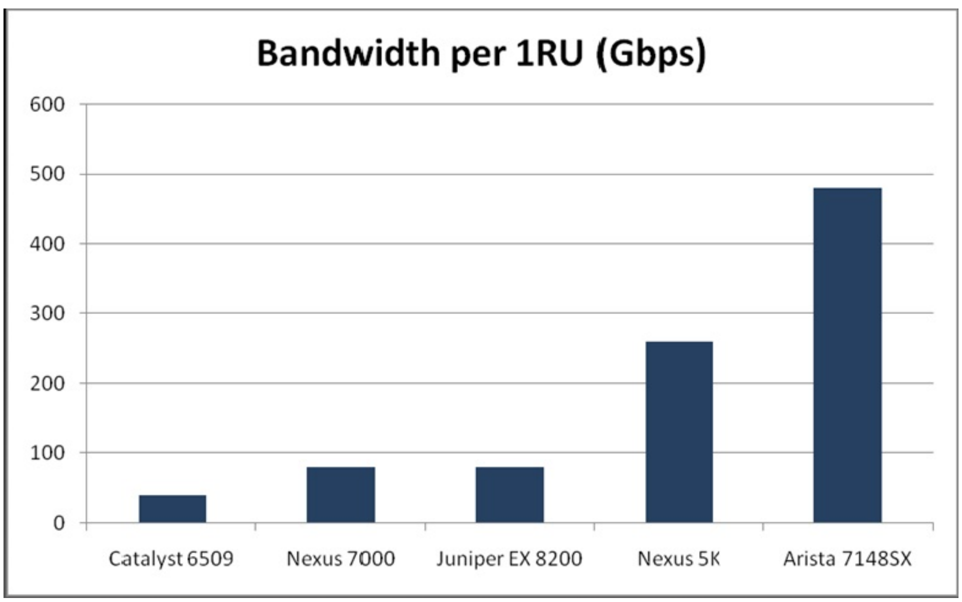
[86] Latency is the delay incurred by each data packet through the switch. Jitter is the variability of that delay.

[87] http://www.networkworld.com/article/2241573/virtualization/latency-and-jitter--cut-through-design-pays-off-for-arista--blade.html; *see also* Redacted Birnbaum Dep. Tr. at 33:25-34:1-11 "The Cisco switch had one property in particular that recall that was quite bad which is that it had a lot of what we call tail jitter which is when you pushed it hard, it seemed to get overloaded and the latency spiked dramatically. I mean it was really very severe. I don't remember the exact chart except that if you look at it on -- you know, if I can draw with my hand, it looked pretty flat and then when you pushed it, it just exploded."



ARISTANDCA00268478

Arista's 7148SX also stands out against Cisco products in terms of bandwidth:



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97. Arista was created for purposes of serving the high-speed switching market, and so emphasizes capabilities that are particularly important to each of the major segments within that market, including "private and public cloud" services, web services, high performance computing, low latency applications, and Big Data/business analytics. For segments such as public cloud and web services, these customers are managing the very largest data centers in the

world. With these companies, Arista emphasizes features surrounding scalability, programmability, provisioning and low power consumption.[88]

98. Arista products are designed with a large number of receive buffers for dealing with data streams from several application servers simultaneously for applications requiring a high volume of "east-west" traffic within the data center, such as "big data" environments like Hadoop. For example, a web server might be responding to my request for a company's web page, but also needs to fill in the ad space sold to an advertiser. It then sends a request to an ad server located within a different rack in the data center. The request may be handled by several switches before it arrives at the ad server. Simultaneously, other users may also be requesting web pages from the same site, generating many more requests to the same ad server. As a consequence of this large traffic "burst" sent to one server, the switch closest to the ad server should be capable of storing all of the ad insertion requests until the ad server can process them. For High Performance Computing (HPC) applications, emphasis is placed on throughput, density and power consumption.[89] And for applications such as financial trading, Arista emphasizes its ability to consistently achieve the fastest speeds (lowest latency).[90] I note that in none of these segments has Arista emphasized its use of a Cisco-like CLI. These segments are on the leading edge of switching, and customers are focused on how Arista's performance, automation, or operating costs (OPEX) will improve their networks.[91]

99. In this particular presentation of Arista's claims to competitive advantages, having an industry-standard CLI appears only on the second to last page, in a general description

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[88] ANI-ITC-944-945-3730417 at 432-35 [Sadana Dep. Ex. 1308].
[89] *Id.* at 438.
[90] *Id.* at 439.
[91] Sadana 30(b)(6) Rough Vol. 1 Dep. Tr. at 9:2-3, 20:11, 65:25; *see also* paragraph 101.

of data center needs.[92] Here, Arista highlights the fact that Arista works well in multi-vendor environments thanks in part to its industry-standard CLI, as one of seven enumerated Arista advantages. This is consistent with the role of a standard CLI—it facilitates the network engineer's management of devices regardless of vendor, and enables competitors to compete based upon the technical merits of handling user traffic as opposed to the customer's sunk investment in a particular vendor's man-machine interface.

100. Arista serves a diverse set of customers with varied needs and preferences. Therefore, different features or performance metrics appeal to different customers, depending on their given industry, preexisting equipment structure, and in some cases, company politics. Although it is nearly impossible to completely disentangle the various motivations that drive customers to choose one competitor's product over another, the following preferences stand out within the market segments that Arista and its competitors sell their products in.

i) According to Arista's sales force and reseller partners,[93] prospective "cloud" customers evaluate vendors' and their switch products on several attributes, including:

a) performance and resiliency;

b) automation ("zero-touch provisioning" and eAPI)

c) software and hardware quality

d) support

e) price

ii) In addition to the product attributes in paragraph 101(i), prospective customers who are service providers such as Verizon or Comcast, also evaluate the features of a

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92 ANI-ITC-944-945-3730417 at 440.

93 Sadana 30(b)(6) Rough Vol. 1 Dep. Tr. at 76-77.

vendor's switch product that are required for a "multi-tenant" environment.[94] A service provider's data center must separate and segregate data traffic of each of its customers for security, performance and billing purposes. Switches within their data centers must provide "tunneling" and routing capabilities that isolate one customer's traffic from another's.

iii) Service providers rooted in telephony services often require that network switches comply with NEBS (Network Equipment Building System) standards for physical characteristics such as power, cooling, and packaging.

iv) As noted above, customers in the financial markets, particularly investment banks and brokerage houses that engage in high-speed trading, in addition to the attributes listed in paragraph 101(i), are very concerned with switch latency and jitter, or latency variability; multicast (one-to-many traffic streams) performance; and network convergence times, the ability for the switch to recalculate paths to each known network in the event of a failure of some type.[95] These characteristics of network behavior have a direct impact on their business, since delay of a trade can translate into millions of dollars of losses. As one Arista customer in the banking industry pointed out:

> Typically people that are sending you these [electronic trading] orders are tracking the latency and so if they are seeing lots of jitter in their latency, they may move those orders to a different place that they think has better latency because usually they have their own strategy engines that are determining when they want to do a trade and so if you're late getting that trade from them to the market, you can have severe— like they think the thing should be at five dollars and it ends up trading at five dollars and two cents, it's not a big deal if it's five shares but if it's a million shares, it could be a lot of money.[96]

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94 Sadana 30(b)(6) Rough Vol. 2 Dep. Tr. at 77-78.

95 *Id.* at 78-79.

96 Redacted Birnbaum Dep. Tr. at 23:8-23.

v) Other enterprise customers have requirements that ease the integration of their switches with other network equipment including IP storage systems, VMware, firewalls, and load balancers[97] as well as the attributes listed in paragraph 101(i) above.

101. Specifically, Microsoft has cited Arista 7500 series switch EOS architecture, 10-gig performance, routing capabilities, power efficiency, and the way it separated an open Linux kernel from the rest of the operating system—which translates into high reliability.[98] Netflix also chose Arista's 7500 because it needed high density and power efficiency and liked the EOS and programmability features.[99] Comcast also purchased the 7500 switch because of its deep packet buffers, high density 40-gig support and 10-gig support shipping, and choose it over the Nexus 6000 because it did not have any IPv6 issues.[100] Arista 7500 series products allowed Microsoft to aggregate all of its racks and build a resilient large-scale network in which no single device could bring down the whole network by failing.[101] Meanwhile Facebook purchased Arista's 7300 series based on the reconvergence of its software stack under any failure condition.[102] Google started purchasing the 7050 and 7500 series from Arista because of how the open Linux kernel allowed it to integrate Arista's products into its system, along with the switches' ability to achieve high density 40 gig and give 100 gig connectivity on the same platform.[103] Meanwhile, AT&T cited Arista's 7280 switch's use of merchant silicone, which provided it with "cloud-like' technologies.[104]

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[97] *Id.* at 79-80.
[98] Sadana 30(b)(6) Rough Vol. 1 Dep. Tr. at 31:24-25-32:1-2, 36:4-5.
[99] Sadana 30(b)(6) Rough Vol. 2 Dep. Tr. at 59:7-19.
[100] Sadana 30(b)(6) Rough Vol. 2 Dep. Tr. at 9:12-16.
[101] Sadana 30(b)(6) Rough Vol. 1 Dep. Tr. at 36:17-25-37:1-7.
[102] Sadana 30(b)(6) Rough Vol. 1 Dep. Tr. at 72:1-4.
[103] Sadana 30(b)(6) Rough Vol. 1 Dep. Tr. at 93:16-20-94:1-2.
[104] Sadana 30(b)(6) Rough Vol. 2 Dep. Tr. at 23:24-25-24:1-3.

102. I note that from the evidence available from these customers or prospective customers, none mentioned a "Cisco-like CLI" or "industry-standard CLI" on their list of switch product requirements.

103. I offer no opinion as to whether any of Arista's switches are superior to the most closely related Cisco switches. I appreciate that each customer likely has its own focus, and will value some features or performance achievements over others. I note that Arista's switches have received very favorable reviews and high praise for their quality and performance.[105] However, it is plain from reviewing even the presentation materials that Cisco selected to use in Arista depositions that Arista's sales and marketing efforts focus on performance and differentiating features, not the CLI.[106] And the available evidence suggests that Arista's main customers all have chosen Arista because of product features other than the CLI.

104. A similar CLI is ultimately not the lead marketing message that vendors' sales teams use to win potential customers.[107] Customers simply require an industry-standard CLI because of investment they have already made.[108] It reduces some barriers to entry, but it is not a primary selling point.[109] Customers simply expect all of their vendors to provide a CLI that is similar to Cisco's, so barring one vendor would reduce customer's choice.[110]

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[105] See Interop Awards, 2013, 2010, http://www.interop.com/lasvegas/special-events/best-of-interop-awards.php; http://www.networkworld.com/article/3048914/cloud-computing/arista-takes-on-cisco-juniper-at-routing.html; http://www.networkworld.com/article/3025413/cisco-subnet/arista-beefs-up-eos-to-make-cloud-migrations-easier.html; http://www.networkworld.com/article/2241525/virtualization/arista--blade-win-top-spot-in-data-center-switch-test.html .

[106] ANI-ITC-944_945-3930871 at 899-904 (noting marked superiority on parameters such as density and power consumption) ANI-ITC-944_945-3670618 at 633-657; Foss Dep. Ex. 173; Ullal Dep. Ex. 353; Hull Dep. Exs. 498, 501, 509, 511, 512, 513.

[107] *See* Foss Dep. Tr. at. 95:18-22; ANI-ITC-944_945 3632834;ARISTANDCA10200601.

[108] *See* Redacted Sadana Dep. Tr. (March 17, 2016) at 109:1-4.

[109] *See* Foss Dep. Tr. at. 177:11-14; 177:22-25-178:1-3; 179:5-10.

[110] *See* supra section VII.

B. Market share data suggests that the use of an IOS-like CLI by Arista has not been a cause of market harm to Cisco.

105. Cisco has long been aware of the existence of other vendors' implementations of CLI similar to Cisco's.[111] As any rational business leader would conclude, if Cisco believed common IOS commands caused it market harm, it would have attempted to stop such widespread usage by others long ago. But Cisco has not.

106. To evaluate whether having a CLI common to Cisco was a cause of market harm to Cisco, I considered the relative market shares of Cisco and three competitors in the data center Ethernet switching market: Force10 (now Dell),[112] Brocade and HP. The Dell/Force10 CLI was found to be the closest match with that of Cisco's,[113] as demonstrated in a Dell video.[114] Dell competes with Cisco in the chassis/modular high-speed ethernet data center switch market.[115] Specifically, Force10's specialty is in high-performance and high-density switches used by research labs, web-hosting companies, and financial trading organizations.[116] The CLIs of Brocade and HP were found to be similar to that of Cisco's, although not as similar as Dell's.[117]

107. If a competitor's use of CLI common to Cisco's caused Cisco market harm, we would expect to see that competitor's market share increase over time. Since Dell/Force10's CLI most closely resembles that of Cisco's, we would expect the market share of Dell in particular to increase.

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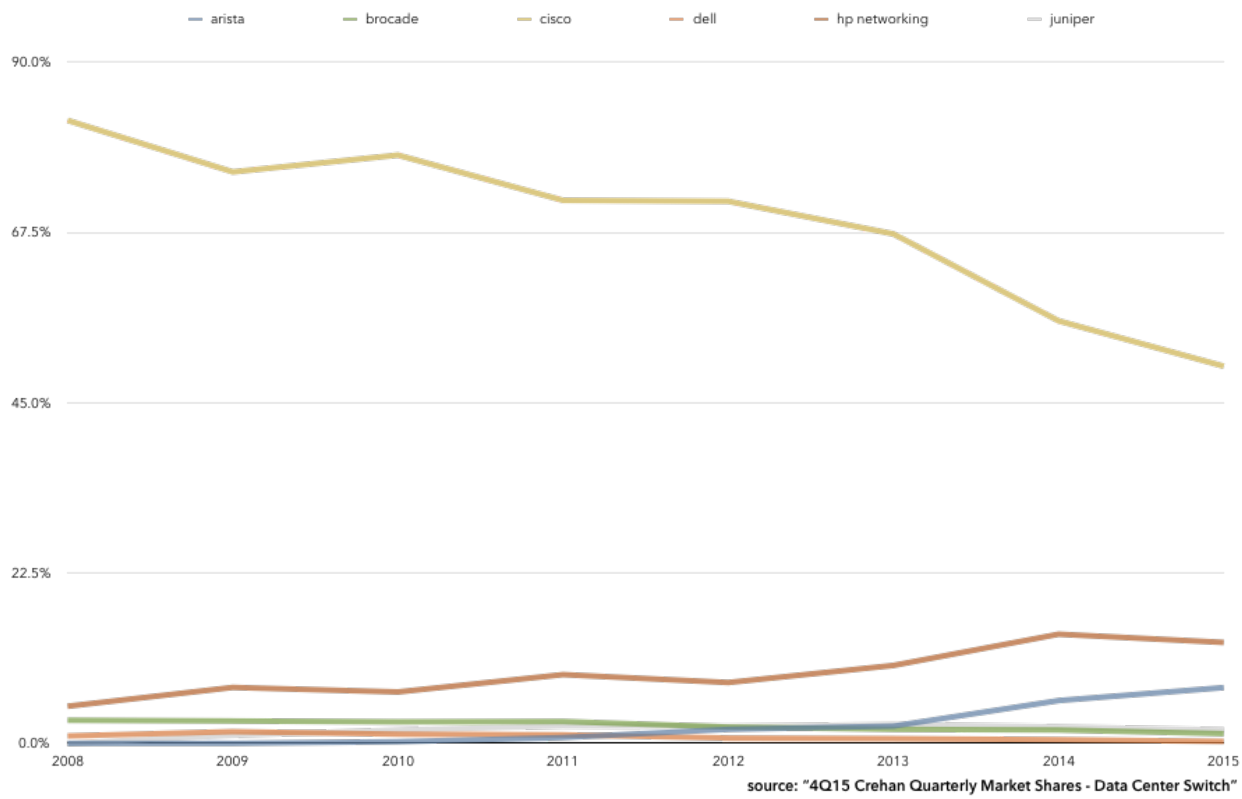
[111] See supra section VII at paragraphs 77-78, 80, 85.
[112] http://www.networkworld.com/article/2179414/virtualization/dell-takes-deeper-dive-into-networking--buys-force10.html .
[113] Black Vendor Comparison Chart-Accused Commands; John Black telephone conversation, May 31, 2016.
[114] ARISTANDCA00232401.
[115] 4Q15 Crehan Quarterly Market Shares - Data Center Switch," Crehan, Mar 2016.
[116] http://www.networkworld.com/article/2179414/virtualization/dell-takes-deeper-dive-into-networking--buys-force10.html.
[117] Black Vendor Comparison Chart—Accused Commands.

108. Instead, per the chart below, we see that Dell's Cisco-like CLI did not appear to provide it any assistance competing against Cisco. The market share for chassis/modular data center ethernet switch ports supplied by Brocade, Dell and Cisco all *declined* during the period 2008-2015 while HP Networking's market share increased. Dell did not gain any market share even after its acquisition of Force10 in 2011,[118] despite the switch maker's Cisco-like CLI.



109. The market data illustrated in the graph above also shows that Arista's market share increased beginning sometime in 2013 and increased to approximately 7% of the market by the end of 2015. There are two observations to draw from this. First, despite having implemented an "industry-standard" CLI in its initial product family, Arista's market share remained well below that of other vendors who also had implemented the Cisco industry-

[118] http://www.networkworld.com/article/2179414/virtualization/dell-takes-deeper-dive-into-networking--buys-force10.html.

standard CLI for five years. Therefore the CLI was not enabling market gains for Arista (nor was it enabling appreciable market gains for the other industry-standard CLI competitors). Second, because Arista began gaining appreciable market share in 2012/2013 while Dell/Force10 did not, this serves as a further data point refuting the theory that having an industry-standard CLI results in market gains or leads to market harm for Cisco. Arista's market share trajectory is explained at least in part by its suitability for the burgeoning cloud computing market.[119]

110. The similarity of a vendor's CLI to Cisco's CLI does not correlate with changes to that vendor's market share. Consistent with the testimonial evidence I discuss above in paragraphs 101-102, this market share data suggests that product attributes *other* than the CLI—performance, product features, reliability, etc.— are the determining factors in customer purchase decisions for data center Ethernet switches.[120]

111. The objective market evidence indicates that use of common CLI by other vendors likely has not affected Cisco's market share. To the extent that Arista has grown its market share in the high speed data center, or done so partially at the expense of Cisco, all of the evidence suggests that it is because of Arista's features and performance superiority. There is no indication that Arista's growth has been a result of the same common commands supplied in products offered by many other manufacturers, nor would that be consistent with my experience in the industry.

112. Specifically, based upon my experience in the industry and my review of materials discussed here, the root of Arista's sales growth is likely its product hardware and

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[119] http://www.nasdaq.com/article/arista-networks-hot-off-ipo-builds-with-cloud-trend-cm390447 "The cloud computing trend has become a rainmaker for investors in Arista Networks."; http://finance.yahoo.com/news/ipo-arista-targets-cisco-hot-221600121.html; http://www.networkworld.com/article/3048914/cloud-computing/arista-takes-on-cisco-juniper-at-routing.html; http://www.networkworld.com/article/3023848/cloud-computing/arista-networks-pops-next-gen-os.html; *see also* supra paragraphs 89, 90, 98.

[120] 4Q15 Crehan Quarterly Market Shares - Data Center Switch," Crehan, Mar 2016.

software architecture.[121] The Arista architecture has enabled their product developers to produce a rich feature set that appeals to a broad spectrum of customers—not because its command line interface resembles that of Cisco's or any other vendor's. A system architecture is implemented in hardware and software. Arista's architecture was designed from the beginning to be modular, allowing for key components to easily be replaced by creating device-independent interfaces, for example. This characteristic allows the company to more quickly integrate new designs from merchant chip vendors like Broadcom, which gives Arista a time-to-market advantage for the introduction of new models.[122] The use of an unmodified Linux kernel as the core operating system provides a very high degree of resiliency and reliability, with the ability to rapidly integrate new features and functions. The Arista architecture is a competitive advantage for the company by enabling the delivery of new products or product enhancements with a shorter time-to-market than the competition. Innovation remains the driving force of the networking industry, and Arista's architecture is one of the most innovative designs that I have seen in many years.

113. In summary I conclude that market share data, combined with the other available evidence regarding Arista's marketing and sales, suggests that it is highly unlikely that Arista's industry-standard command line interface resembling that of Cisco's has caused any harm to the market for Cisco's products incorporating IOS, NX OS or IOS XR. To the extent Cisco has lost market share, or to the extent Arista has gained market share, all available evidence suggests that it is due to Arista product characteristics other than the CLI. Customers of network equipment expect all vendors to conform to the standards prevalent within the industry whether those standards are created by formal standards organizations or by vendors themselves. Without standards, the Internet as we know it would not exist, and there would not be as many market

[121] http://www.bradreese.com/blog/3-18-2015.htm.

[122] "Networking Technology," Henderson, A., Needham & Co. research note, March 18, 2015.

participants in the manufacturing of switches and routers as there are. The standards that exist in the networking industry allow customers to freely choose from a number of potential suppliers with the assurance that those products will properly interoperate, can be installed and operated by trained network experts, and provide a high degree of certainty that such a multi-vendor network will provide reliable service to its users at a competitive cost of ownership. And as important for the customers, those standards force competitive equipment suppliers to innovate above and beyond the standards to win customers. I am not aware of any instance in the history of networking in which the mere following of an industry convention or standard resulted in market share gain; in fact, it is illogical even to conceive of such a result since being the "same" cannot win customers. So too here in the ethernet switching market where Arista's success has been the result of many factors, but not the CLI.

EXHIBIT A

William M Seifert

128 Dover Road Wellesley, Massachusetts 02482 Mobile: 617.803.6987 E-Mail: bseifert@icloud.com

Summary

I am an experienced engineer/entrepreneur, who has founded and held leadership positions in a number of software-intensive communications companies. I possess deep experience in conceiving and delivering new products to market, managing product development and marketing organizations, and building relationships with strategic partners. I have served on numerous corporate boards of directors for both private and public companies, with service on strategic, audit, and compensation committees. I am also actively involved in leadership roles with several volunteer organizations.

Specialties: Formulating and executing on the strategic vision of a company through technological innovation; translating a company's strategy into concrete operating goals, objectives, and plans that drive top-line growth; providing effective team leadership in addressing operational issues; developing LEAN engineering organizations; understanding and translating customer needs into new product requirements; executing on bringing complex product developments to market; providing an effective public "voice" at conferences, seminars, etc.

Skills Profile

- Execution-focused, innovative technologist experienced in product definition, market analysis and engineering design, architecture and engineering development for delivering new products to market on plan
- Experienced venture capital investor with several series A-to-liquidity events , successfully negotiating mergers and acquisitions with such companies as Lucent, Hewlett-Packard, IBM, and Skyworks Solutions
- Extensive network of professional and executive contacts in multiple industries and technologies
- Proven execution skills at every management level including CEO, CTO, VP Product Management and VP, Engineering
- Corporate and product strategist, with proven skills in strategic planning, goal and objective setting and establishment of operational plans
- Experienced and engaged board member, active on various committees - executive, compensation, audit - of both private and public companies
- Effective public speaker and presenter

William M Seifert

Experience

IT and business consultant — October 2013 – Present

- I provide independent analysis, advice, and implementation of computing and networking products and services for manufacturers, resellers, and end-users. I have broad-based experience and knowledge of computer networking technologies, deployment techniques, and operational acumen. I bring a business-oriented approach to every problem and solution, and can assist in hands-on deployment of practical networked computing systems and applications.

Chief Technology Officer, Avaya Networking — April 2010 – October 2013

- Developed strategic relationships with technology and business partners in Ethernet-based storage, video surveillance, and WAN optimization, creating a new architectural framework for leveraging Avaya's leadership in IEEE 802.1aq Shortest Path Bridging over local and wide-area networks based on the VSP switch family. I worked with Avaya's corporate strategic planning and m&a groups for setting a new path for the company, and participated in industry events and technology forums for this former Nortel data networking business unit acquired by Avaya in late 2009

Independent Consultant — July 2009 – March 2010

- Consulted for information technology companies, particularly for communications equipment manufacturers, wireless component and subsystem suppliers, and communications software vendors

General Partner, Prism VentureWorks — October 1998 – June 2009

- Recruited by managing general partner as first non-founder general partner of this early-stage information technology and life science venture capital firm
- Raised over $1B for funds III through V, during the period 2000 - 2005
- Led and managed investments in several successful early-stage technology start-up companies resulting in returns of 3x - 5x to Prism's limited partner investors: Telica (carrier IP telephony manufacturer), DSL.net (CLEC service provider), Collation (J2EE network management), Colubris Networks (802.11 a/b/g/n WiFi intelligent access points), SiGe Semiconductor (mixed-signal ICs, 802.11 a/b/g/n RF front-end modules)
- Served as an active board member for fifteen companies over eleven years
- Held offices of Chairman and acting CEO for Colubris Networks and Sagamore Systems
- Initiated and chaired Prism's CEO Summits, showcasing portfolio companies and CEOs to industry executives and other venture capital investors

Member, Board of Directors, Digital Lightwave — October 1997 – October 2000

- Served as lead independent director for this manufacturer of portable optical network protocol analyzers

William M Seifert

- Chaired special committee formed to handle fall-out from Q1'98 financial restatement including: hiring lead investigating attorneys and outside litigation counsel to manage shareholder actions; recruiting new CEO and management team; settling shareholder class action lawsuits; raising outside capital from private investor
- Actively assisted new CEO in executing corporate turnaround, bringing company back to profitability, increasing share price over 6000% (from $2/share in 1998, over $120/share in 2000)

President & CEO, Founder, Agile Networks **November 1992 – November 1997**

- Conceived novel product integrating ATM and Ethernet switching technologies with automated vlan software to seamlessly network distributed computing resources for campus and enterprise customers
- Assembled management team, recruited core engineering team, and raised $6.2m first-round venture capital from Accel Partners, Oak Investment Partners, Charles River Ventures, and ABS Ventures
- Awarded the Most Innovative New Product at Networld-Interop '94, for the company's first product offering, ATMizer 1000
- Delivered over 500 ATMizer systems to premiere Fortune 500 companies and leading universities, including Bear-Stearns, Hewlett-Packard, Lucent Technologies, University of Mississippi, Georgia Tech
- Sold company to Lucent Technologies in October, 1996, (first acquisition following Lucent's September, 1996 spin-out from AT&T) generating over 8x return to first-round investors

Vice President & CTO, Founder, Wellfleet Communications **June 1986 – November 1991**

- Conceived and architected the first multiprotocol bridge-router for interconnecting LANs over high-speed digital circuits
- Recruited and staffed core engineering team; delivered first product to market in November, 1988; assisted CEO in raising three rounds of venture capital; supported Senior VP, Sales & Marketing, in closing large early accounts: 3M, Bear-Stearns, Combustion Technology, Bell Atlantic, NYNEX, Swisscom, and Credit Suisse
- Drafted Form S-1 product and technology sections for Wellfleet's initial public offering in August, 1991 with a market capitalization exceeding $300M in the first day of trading on NASDAQ

Design Engineer, Interlan, Inc **June 1981 – November 1985**

- Cofounder and first design engineer of this startup, one of the first manufacturers of Ethernet controllers for then-popular computer systems, e.g., DEC VAX, PDP-11, LSI-11, Intel Multibus, Data General Eclipse, IBM PC.

William M Seifert

- Chief engineer of the NTS-10 Ethernet Terminal Server, and codeveloped an in-house engineered implementation of the Xerox Network Systems protocol stack, used in the NTS-10 and other XNS-based networking software ported to several operating systems.

Design Engineer, Digital Equipment Corporation **July 1979 – May 1981**

- Served as a systems engineer in the Microcomputer Products Group within Digital and the group's engineering representative to the Digital-Intel-Xerox working group that drafted the Ethernet Blue Book specification published in September, 1980.
- Developed a remote debugger for embedded LSI-11 applications development, provided technical support for a number of customers
- Designed and implemented Fortran navigation software for Courageous, an entrant in the 1980 America's Cup, captained by Ted Turner.

Member of Technical Staff, Los Alamos Scientific Laboratory **September 1975 – June 1979**

- Provided turn-key engineering design, and implementation of microcomputer systems and software for a variety of projects within Group E-5
- Maintained software used for control of the Plutonium Reprocessing Facility; designed and wrote one of the first microcomputer programs used to control milling machines for the fabrication of components employed in devices for the National Test Site near Las Vegas, NV
- Led the software team responsible for the data acquisition and control software for Antares, a 100kJ laser fusion facility

Military Service

Basic & Advanced Individual Training, Ft Polk, LA **September 1971 - January 1972**

Officer Candidate School (RC), Ft Benning, GA **February 1972 - May 1972**

Signal Officer Basic Course, Ft Gordon, GA **June 1972 - August 1972**

Lieutenant, U.S. Army Signal Corps, Michigan ARNG **September 1972 – August 1975**

Individual Ready Reserve, U.S. Army **September 1975 - August 1977**

William M Seifert

Volunteer

Mentor, Massachusetts Institute of Technology Venture Mentoring Service **January 2015 - present**

Provide practical, experienced advice and counsel to aspiring entrepreneurs within the MIT community of students, staff, faculty and alumni.

Member, Board of Directors, Michigan State University Foundation **January 2014 - present**

Assist in directing financial resources to promising research areas within MSU, and through Spartan Innovations, promoting entrepreneurism among students, staff, faculty and alumni of Michigan State.

Member, Board of Directors, Wellesley Youth Football **January 2013 - December 2015**

Provide guidance and support for the participation of Wellesley's finest boys and young men in the greatest game ever invented - football!

Education

Michigan State University, MSEE **September 1973 – June 1975**

Michigan State University, BSEE **September 1967 – June 1971**

William M Seifert

Honors and Awards

John D Ryder Electrical and Computer Engineering Alumni Award **June 2011**

Established in 2004, this award commemorates the outstanding professional contributions of John D. Ryder, former Dean of the College of Engineering at Michigan State University and professor in the department. Nominations are made by alumni, faculty, and students. The department's advisory committee selects the award winner in consultation with the chairperson. The award is given on the basis of contributions in furthering the mission of the department - which is to provide undergraduate and graduate education characterized by quality, access, and relevance; and to develop distinctive research programs in electrosciences, systems, and computer engineering, with the promise of sustained excellence as measured in scholarship, external investment, reputation, and impact.

Publications and Publicity

"Back in the Saddle", Boston Business Journal **December 2010**

"Spending more than a decade in a completely different industry probably qualifies as more than a diversion, but for William Seifert, taking the chief technology officer position in the Data Solution unit at Avaya Technologies Inc. brings him back full circle to the technology he dealt with back in the 1980s when he helped found Wellfleet Communications Inc.…"

"Fast, Cheap, and Out of Control", Wireless Review **November 2002**

"Wi-Fi has liberated the Internet for coffeehouse denizens and home high-speed data hipsters everywhere. But for it to work the same magic in the corporate arena, execs like Bill Seifert of Colubris must convince the industry to solve the growing problem of wireless LAN security…"

"VC in the dugout", Boston Business Journal **October 2001**

"William Seifert knows all about tough venture capital markets. He had roles in creating three technology companies, and each one sought investment dollars in what could be considered soft years…"

"Bridges and Routers", IEEE Network magazine **January 1988**

An examination is made of data link bridges and internetwork routers, two technologies that provide for the extension and interconnection of local networks, which may occur using high-speed wide-area digital data communications services. The discussion of bridges covers simple bridges, learning bridges, source routing, and quality of service offered by bridges. The discussion of routers considers the Transmission Control Protocol and Internet Protocol (known as TCP/IP) used by ARPAnet, DECnet, and quality of service offered by routers.

EXHIBIT B

EXHIBIT B
William Seifert
Documents Considered List

Depositions

Redacted Deposition Transcript of Anshul Sadana taken March 17, 2016 and accompanying Exhibits
Rough Deposition Transcript of Anshul Sadana taken March 26, 2016 and accompanying Exhibits
Rough Deposition Transcript of Anshul Sadana taken March 27, 2016 and accompanying Exhibits
Deposition Transcript of Anthony J. Li, taken February 1, 2016
Deposition Transcript of Balaji Venkatraman, taken May 2, 2016
Redacted Deposition Transcript of Gavin Cato, Dell 30(b)(6), taken May 20, 2016
Deposition Transcript of Gregory Satz, taken March 23, 2016 and accompanying exhibits
Deposition Transcript of Mark Edward Berly, taken April 5, 2016
Deposition Transcript of Mark Foss, taken February 4, 2016 and accompanying exhibits
Deposition Transcript of Martin Hull, taken April 14, 2016 and accompanying exhibits
Deposition Transcript of Soni Jiandani, taken April 29, 2016 and accompanying exhibits
Redacted Rough Deposition Transcript of Jeffrey Birnbaum, taken May 17, 2016
Deposition Transcript of Philp Kasten, taken February 16, 2016

Discovery

Redacted Arista's 6th Supplemental Response to Cisco's 1st Set of Interrogatories, dated February 19, 2016

RFC's

RFC 1094
RFC 1242
RFC 3530

Conversations

Steve Collins telephone conversation, 15 May 2016
McKusick telephone conversation, 24 May 2016
Marten Terpstra telephone conversation, 25 May 2016
John Black telephone conversation, May 31, 2016
Cate Elsten, Nick Baciu, and Calvin Sy telephone conversation, 27 May 2016

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Websites

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"A Mission Statement for the IETF," Oct. 2004 *available at* http://www.ietf.org/rfc/rfc3935.txthttp://www.ietf.org/rfc/rfc3935.txt
Barry M. Leiner et al., *The Past and Future History of the Internet* Communications of the ACM Feb. 1997 http://bnrg.eecs.berkeley.edu/~randy/Courses/CS294.S13/1.1x.pdf
"Brief History of the Internet," Cerf et al, October 2012, internetsociety.org
"Brief History of the Internet," Leiner, Cerf et al, Internet Society, 2009
Computer History Museum, on-line archive, http://www.computerhistory.org
Global Consumer Internet Traffic 20102015," MediaBuyerPlanner.com
http://bnrg.eecs.berkeley.edu/~randy/Courses/CS294.S13/1.1x.pdf
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https://downloads.avaya.com/css/P8/documents/100169443
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http://www.ietf.org/rfc/rfc3935.txt
Why the TailF acquisition is a big win for Cisco," Kerravala, Z., Network World
Years of Engineering the Internet, IETF Blog *available at* https://www.ietf.org/blog/2016/01/30-years-of-engineering-the-internet/

Manuals, Books, and Presentations

"TOPS20 ARPAnet User Utilities Guide," Digital Equipment Corporation, October, 1983
"TOPS20 Commands Reference Manual," Digital Equipment Corporation, September, 1985
"Xerox Network System Architecture Manual, April, 1985
"The Ethernet, A Local Area Network," DigitalIntelXerox, September, 1980
Proteon Series p4200 Gateway Software User's Manual", Proteon, Inc., March, 1988
"Computer Networks," Tannebaum, A., Wetherall, D., 2001 (fifth edition), Prentice-Hall
"Gateway System Manual", cisco Systems, July, 1988
"The Tao of IETF: A Novice's Guide to the Internet Engineering Task Force," Hoffman, J., IETF Trust, 2012
"Unix, Linux, and BSD: Command Line Cross-Reference," Marsh, N., FatFreePublishing.com, 2009
"DECServer 100 Terminal Server Operations Guide," Digital Equipment Corporation, January, 1985
"The Ethernet Roadmap Panel 2015," Kipp, S., Ethernet Alliance presentation, Mar 2015

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ARISTANDCA00010491
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William Seifert
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- Dell'Oro Group's "Ethernet Switch Data Center Quarterly Report 4Q15
- Dennis Freeman email to general sun listserv, Subject: ONC/NFS Update, 19 Apr 1991
- Kirk McKusick email to Stephen X. Nahm, Subject: Sun RPC in BSD, Fri, 19 May 1989
- Stephen X. Nahm email to Kirk McKusick, Subject: Sun RPC in BSD, 19 May 1989
- Black Vendor Comparison Chart accused Commands
- William T. Nelson Declaration in Support of Blade Network Technologies, dated May 27, 2016
- Networking Technology", Henderson, A., Needham & Co. research note, March 18, 2015
- "Commercial aspirations" (graph), ComputerWorld, pg 20, 21 September 1992
- "The Standards Industry," Seltzer, L., Internet World, pgs 50-53, 15 April 2001
- "Routers Buyers Guide," Network World, September 27, 1993
- And All Materials Cited or Considered in the Attached Expert Report

EXHIBIT C

APPENDIX C - Summary of Industry Usage of Command Modes and Prompts

Cisco Command Mode	Stanford Ethertip/Gateway Modes	Adtran AOS Command Mode	Alcatel Command Mode	Allied Telesis Command Mode	Lucent Command Mode
User EXEC	User	Basic (command security level)	Normal Exec	User Exec	User
Privileged EXEC	Privileged	Enable (command security level)	Privileged Exec	Privileged Exec	Privileged
Global Configuration	N/A	Global (configuration mode)	Global Configuration	Global Configuration	Global
Interface Configuration	N/A	Interface (configuration mode)	Interface Configuration	Interface Configuration	Interface

Cisco Command Prompt	Stanford Ethertip/Gateway Prompts	Adtran AOS Command Prompt	Alcatel Command Prompt	Allied Telesis Command Prompt	Lucent Command Prompt
router> switch>	>	Router>	Console>	Console>	Cajun>
router# switch#	#	Router#	Console#	Console#	Cajun#
router(config)# switch(config)#	N/A	Router(config)#	Console(config)#	Console(config)#	Cajun (configure)#
router(config-if)# router(config-if)#	N/A	Router(config-interface)#	Console(config-if)#	Console(config-if)#	Cajun (config-if:interface)#

APPENDIX C - Summary of Industry Usage of Command Modes and Prompts

Nortel NNCLI Command Mode	Avaya ERS 8600 Command Mode	Foundry Command Mode	Brocade Command Mode	Dell Command Mode	Force 10 Command Mode (2008+)
User EXEC	User EXEC	User EXEC	User EXEC	User EXEC	User Exec
Privileged EXEC	Privileged EXEC	Privileged EXEC	Privileged EXEC	Privileged EXEC	Privileged Exec
Global Configuration	Global Configuration	Global CONFIG	Global configuration	Global Configuration	Global Config
Interface Configuration	Interface Configuration	Interface CONFIG	Interface subtype configuration	Interface Configuration	Interface Config
Nortel NNCLI Command Prompt	**Avaya ERS 8600 Command Prompt**	**Foundry Command Prompt**	**Brocade Command Prompt**	**Dell Command Prompt**	**Force 10 Command Prompt**
Passport-8300:5>	ERS-8600:5>	BigIron>	device>	console>	hostname >
Passport-8300:5#	ERS-8600:5#	BigIron#	device#	console#	hostname #
Passport-8300:5(config)#	ERS-8600:5<config>#	BigIron(config)#	device(config)#	console(config)#	hostname (Config)#
Passport-8300:5(config-if)#	ERS-8600<config-if>#	BigIron(config-if-5/1)#	device(config-if-e1000-1/1/1)#	console(config-if)#	hostname (conf-if-vl-vlan-id)#

APPENDIX C - Summary of Industry Usage of Command Modes and Prompts

D-Link CLI Command Mode	Edge-Core CLI Command Mode	Ericsson (2006) CLI Command Mode	Ericsson (2009) CLI Command Mode	Redback CLI Command Mode	Extreme Networks CLI Command Mode
User EXEC	Normal EXEC	Normal EXEC	User EXEC	Exec (privilege level < 6)	User Exec (or USER EXEC)
Privileged EXEC	Privileged EXEC	Privileged EXEC	Privileged EXEC	Exec (privilege level 6+)	Privileged Exec (or PRIV EXEC)
Global Configuration	Global Configuration	Global Configuration	Global Configuration	Global Configuration	Global Configuration
Interface Configuration	Interface Configuration	Interface Configuration	Interface Configuration	Interface Configuration	Interface Configuration

D-Link CLI Command Prompt	Edge-Core CLI Command Prompt	Ericsson (2006) CLI Command Prompt	Ericsson (2009) CLI Command Prompt	Redback CLI Command Prompt	Extreme Networks CLI Command Prompt
Console>	Console>	Console>	esn212>	>	WMController>
Console#	Console#	Console#	esn212#	#	WMController#
Console(config)#	Console(config)#	Console(config)#	esn212(config)#	(config)#	WMController(config)#
Console(config-if)#	Console(config-if)#	Console(config-if)#	esn212(config-if)#	(config-if)#	WMController(config-if)#

APPENDIX C - Summary of Industry Usage of Command Modes and Prompts

HP ProCurve CLI Command Mode	Unisphere CLI Command Mode	Juniper JUNOSe CLI Command Mode	ISCLI Command Mode	NETGEAR ProSAFE Command Mode	NextHop Command Mode
User EXEC	User EXEC	User EXEC	User EXEC	User EXEC	User Execution
Privileged Exec	Privileged Exec	Privileged EXEC	Privileged Exec	Privileged Exec	Privileged Execution
CONFIG (“global CONFIG” level)	Global Configuration	Global Configuration	Global Configuration	Global Config	Global Configuration
CONFIG (“interface level”)	Interface Configuration	Interface Configuration	Interface Port Configuration	Interface Config	Interface Configuration
HP ProCurve CLI Command Prompt	**Unisphere CLI Command Prompt**	**Juniper JUNOSe CLI Command Prompt**	**ISCLI Command Prompt**	**NETGEAR ProSAFE Command Prompt**	**NextHop Command Prompt**
HP9300>	ERX-0-1-90>	host1>	G8000>	Switch>	routerz>
HP9300#	ERX-0-1-90#	host1#	G8000#	Switch#	routerz#
HP9300(config)#	ERX-0-1-90(config)#	host1(config)#	G8000(config)#	Switch (Config)#	routerz(config)#
HP9300(config-if-5/1)#	ERX-0-1-90(config-if)#	host1(config-if)#	G8000(config-if)#	Switch (Interface <unit/slot/port>)#	routerz(config-if)#

APPENDIX C - Summary of Industry Usage of Command Modes and Prompts

Oracle/Sun Command Mode (2012)	Procket Command Mode
User EXEC	Operations command mode (Non-Privileged)
Privileged EXEC	Operations command mode (Privileged)
Global Configuration	Configuration command mode
Interface Configuration	Interface subcommand mode
Oracle/Sun Command Prompt (2012)	**Procket Command Prompt**
SEFOS>	Router>
SEFOS#	Router#
SEFOS(config)#	Router(config)#
SEFOS(config-if)#	Router(config-if)#

EXHIBIT D

APPENDIX H.BR - Brocade Usage of Disputed CLI Commands

Disputed Cisco Command	Brocade Command Syntax	Bates Number of Brocade Manual
aaa accounting	aaa accounting exec default start-stop none [no] aaa accounting exec default start-stop radius | tacacs+ | none	ARISTANDCA_BROCADE01785618, ARISTANDCA_BROCADE00062898
aaa authentication login	aaa authentication login { default | ldap | local | radius { local | local-auth-failback } | tacacs+ { local | local-auth-failback } }	ARISTANDCA_BROCADE01785618
address-family	address-family { ipv4 | ipv6 } no address-family { ipv4 | ipv6 }	ARISTANDCA_BROCADE01785618
aggregate-address	aggregate-address { ip-addr ip-mask | ipv6-addr ipv6-mask } [advertise-map map-name] [as-set] [attribute-map map-name] [summary-only] [suppress-map map-name]	ARISTANDCA_BROCADE01785618
area nssa	area { A.B.C.D | decimal } nssa { metric [no-summary] | default-information-originate }	ARISTANDCA_BROCADE01785618
area nssa (OSPFv3)	area { IPv6 address | decimal } nssa [metric] [default-information-originate [metric num] [metric- type { type-1 | type-2 }]] [no-redsitribution] [no-summary] [translator-always] [translator- interval interval]	ARISTANDCA_BROCADE01785618
area nssa default-information-originate	area { A.B.C.D | decimal } nssa { metric [no-summary] | default-information-originate }	ARISTANDCA_BROCADE01785618
area nssa default-information-originate (OSPFv3)	area { IPv6 address | decimal } nssa [metric] [default-information-originate [metric num] [metric- type { type-1 | type-2 }]] [no-redsitribution] [no-summary] [translator-always] [translator- interval interval]	ARISTANDCA_BROCADE01785618
area range	area { A.B.C.D | decimal } range E.F.G.H I.J.K.L [advertise | not-advertise] [cost cost_value]	ARISTANDCA_BROCADE01785618
area range (OSPFv3)	area { IPv6 address | decimal } range ipv6 address/mask [advertise | not-advertise] [cost cost_value]	ARISTANDCA_BROCADE01363517
area stub	area { A.B.C.D | decimal } stub metric [no-summary]	ARISTANDCA_BROCADE01785618
area stub (OSPFv3)	area { A.B.C.D | decimal } stub metric [no-summary]	ARISTANDCA_BROCADE01785618
banner login	banner login message	ARISTANDCA_BROCADE01785618
banner motd	banner motd message	ARISTANDCA_BROCADE01785618
bfd all-interfaces	bfd all-interfaces all-vrfs	ARISTANDCA_BROCADE1530651
bgp redistribute internal	bgp-redistribute-internal	ARISTANDCA_BROCADE01785618
boot system	boot system flash { primary | secondary } [yes]	ARISTANDCA_BROCADE01363517
channel-group	channel-group number mode { active | passive | on } [type { standard | brocade }]	ARISTANDCA_BROCADE01785618
clear arp-cache	clear arp-cache [interface interface-type interface-number [no-refresh]] | [ip ip-address [no-refresh] | [no-refresh]]	ARISTANDCA_BROCADE01689556
clear counters	clear counters [access-list { ip | ipv6 | mac } [all | interface { fcoe [vn-number | all] | port-channel number | fibrechannel rbridge-id/slot/port |<N> gigabitethernet rbridge-id/slot/port } | slot-id number | vlan vlan_id } | storm-control]	ARISTANDCA_BROCADE01785618
clear ip msdp sa-cache	clear ip msdp [vrf vrf-name] sa-cache [ip-addr]	ARISTANDCA_BROCADE01363517
clear ip ospf neighbor	clear ip ospf neighbor { A.B.C.D | all }	ARISTANDCA_BROCADE01785618
clear mac-address-table dynamic	clear mac-address-table dynamic [address mac_address | interface <N> gigabitethernet rbridge-id/ slot/port | vlan vlan_id]	ARISTANDCA_BROCADE01785618
clear spanning-tree counters	clear spanning-tree counter [interface | port-channel number | <N> gigabitethernet rbridge-id/slot/port]	ARISTANDCA_BROCADE01785618
clock set	clock set CCYY-MM-DDTHH:MM:SS [rbridge-id { rbridge-id | all }]	ARISTANDCA_BROCADE01785618
clock timezone	clock timezone region/city [rbridge-id { rbridge-Id | all }]	ARISTANDCA_BROCADE01785618
default-information originate (OSPF)	area { A.B.C.D | decimal } nssa { metric [no-summary] | default-information-originate }	ARISTANDCA_BROCADE01785618
default-information originate (OSPFv3)	area { IPv6 address | decimal } nssa [metric] [default-information-originate [metric num] [metric- type { type-1 | type-2 }]] [no-redsitribution] [no-summary] [translator-always] [translator- interval interval]	ARISTANDCA_BROCADE01785618
default-metric (OSPF)	default-metric metric	ARISTANDCA_BROCADE01785618
default-metric (OSPFv3)	default-metric metric	ARISTANDCA_BROCADE01785618
domain-id	domain-id <domain_identifier>	ARISTANDCA_BROCADE00062898
dot1x port-control	dot1x port-control { auto | force-authorized | force-unauthorized }	ARISTANDCA_BROCADE01785618
dot1x reauthentication	dot1x reauthentication	ARISTANDCA_BROCADE01785618
dot1x timeout reauth-period	dot1x timeout re-authperiod seconds	ARISTANDCA_BROCADE01785618
dot1x timeout tx-period	dot1x timeout tx-period seconds	ARISTANDCA_BROCADE01785618
errdisable recovery cause	errdisable recovery cause { all | cause }	ARISTANDCA_BROCADE01363517
errdisable recovery interval	errdisable recovery interval time	ARISTANDCA_BROCADE01363517
interface ethernet	interface [fibrechannel rbridge-id/slot/port | fcoe vn-number/rbridge-id/front-port-number | <N>gigabitethernet rbridge-id/slot/port | port-channel number | vlan vlan_id]	ARISTANDCA_BROCADE01785618
interface loopback	interface loopback port_number	ARISTANDCA_BROCADE01785618
interface port-channel	interface [fibrechannel rbridge-id/slot/port | fcoe vn-number/rbridge-id/front-port-number | <N>gigabitethernet rbridge-id/slot/port | port-channel number | vlan vlan_id]	ARISTANDCA_BROCADE01785618
interface vlan	interface [fibrechannel rbridge-id/slot/port | fcoe vn-number/rbridge-id/front-port-number | <N>gigabitethernet rbridge-id/slot/port | port-channel number | vlan vlan_id]	ARISTANDCA_BROCADE01785618
ip access-group	ip access-group ACLname { in | out } [switched | routed]	ARISTANDCA_BROCADE01785618
ip access-list	p access-list { standard | extended } ACLname	ARISTANDCA_BROCADE01785618
ip access-list standard	p access-list { standard | extended } ACLname	ARISTANDCA_BROCADE01785618
ip address	ip address ip-address/mask [secondary] [{ ospf-ignore | ospf-active }]	ARISTANDCA_BROCADE01785618
ip as-path access-list	ip as-path access-list string [seq seq-value] [deny regular-expression | permit regular-expression]	ARISTANDCA_BROCADE01785618
ip community-list standard	ip community-list standard community-list-name { deny [community-number | AA:NN] | permit community-number } [seq seq-value] [internet | local-as | no-advertise | no-export]	ARISTANDCA_BROCADE01785618

APPENDIX H.BR - Brocade Usage of Disputed CLI Commands

ip domain lookup	[no] ip domain-loopkup <ip-address> | <host-name>	ARISTANDCA_BROCADE00062898
ip helper-address	ip helper-address address-number [ip-address [unicast]]	ARISTANDCA_BROCADE01363517
ip icmp redirect	ip icmp redirect	ARISTANDCA_BROCADE01785618
ip igmp last-member-query-interval	ip igmp last-member-query-interval *milliseconds*	ARISTANDCA_BROCADE01785618
ip igmp query-interval	ip igmp query-interval *seconds*	ARISTANDCA_BROCADE01785618
ip igmp query-max-response-time	ip igmp query-max-response-time *seconds*	ARISTANDCA_BROCADE01785618
ip igmp static-group	ip igmp static-group *A.B.C.D*	ARISTANDCA_BROCADE01785618
ip igmp version	ip igmp version	ARISTANDCA_BROCADE01363517
ip load-sharing	ip load-sharing	ARISTANDCA_BROCADE01785618
ip multicast boundary	ip multicast-boundary [*prefix-list*]	ARISTANDCA_BROCADE01785618
ip multicast-routing	ip multicast-routing optimization oif-list all ip multicast-routing load-sharing [rebalance]	ARISTANDCA_BROCADE01363517 AND ARISTANDCA_BROCADE1530651
ip nat pool	[no] ip nat pool <pool-name> <start-ip> <end-ip> netmask <ip-mask> | prefix-length <length> [type match-host | rotary]	ARISTANDCA_BROCADE00062898
ip nat translation tcp-timeout	[no] ip nat translation timeout | udp-timeout | tcp-timeout | finrst-timeout | dns-timeout <secs>	ARISTANDCA_BROCADE00062898
ip nat translation udp-timeout	[no] ip nat translation timeout | udp-timeout | tcp-timeout | finrst-timeout | dns-timeout <secs>	ARISTANDCA_BROCADE00062898
ip ospf authentication-key	ip ospf authentication-key { 0 *password* | 2 *password* | 255 *password* | *password* }	ARISTANDCA_BROCADE01785618
ip ospf cost	ip ospf cost *value*	ARISTANDCA_BROCADE01785618
ip ospf dead-interval	ip ospf dead-interval *interval*	ARISTANDCA_BROCADE01785618
ip ospf hello-interval	ip ospf hello-interval *interval*	ARISTANDCA_BROCADE01785618
ip ospf network	ip ospf network { broadcast | point-to-point }	ARISTANDCA_BROCADE01785618
ip ospf priority	ip ospf priority *value*	ARISTANDCA_BROCADE01785618
ip ospf retransmit-interval	ip ospf retransmit-interval *rtx-int*	ARISTANDCA_BROCADE01785618
ip ospf transmit-delay	ip ospf transmit-delay *tx-delay*	ARISTANDCA_BROCADE01785618
ip pim dr-priority	ip pim dr-priority *priority-value*	ARISTANDCA_BROCADE01785618
ip prefix-list	ip prefix-list *name* { [deny *ip-prefix/prefix-length* | permit *ip-prefix/prefix-length*] ge *ge-value* [le *le- value*]] | seq *sequence-number* }	ARISTANDCA_BROCADE01785618
ip proxy-arp	ip proxy-arp	ARISTANDCA_BROCADE01785618
ip radius source-interface	ip radius source-interface { ethernet stack-id/slot/port | loopback number | management number | ve number }	ARISTANDCA_BROCADE01363517
ip route	ip route *A.B.C.D/L A.B.C.D* [*metric*] [distance *distance*] [tag *tag*] ip route A.B.C.D/L { <N>gigabitethernet slot/port ve vlan_id } [metric] [distance distance] [tag tag] ip route A.B.C.D/L null slot/port [metric] [distance distance] [tag tag]	ARISTANDCA_BROCADE01785618
ip tacacs source-interface	ip tacacs source-interface { ethernet stack-id/slot/port | loopback number | management number | ve number }	ARISTANDCA_BROCADE01363517
ipv6 access-list	ipv6 access-list { standard | extended } *ACLname*	ARISTANDCA_BROCADE01785618
ipv6 address	ipv6 address *ipv6-prefix/prefix-length* [secondary]	ARISTANDCA_BROCADE01785618
ipv6 enable	ipv6 enable	ARISTANDCA_BROCADE01363517
ipv6 access-group	ipv6 access-group *ACLname* { in | out } [switched | routed]	ARISTANDCA_BROCADE01785618
ipv6 nd managed-config-flag	ipv6 nd managed-config-flag	ARISTANDCA_BROCADE01785618
ipv6 nd ns-interval	ipv6 nd ns-interval *seconds*	ARISTANDCA_BROCADE01785618
ipv6 nd other-config-flag	ipv6 nd other-config-flag	ARISTANDCA_BROCADE01785618
ipv6 nd ra interval	ipv6 nd ra-interval *max-value* min *min-value*	ARISTANDCA_BROCADE01785618
ipv6 nd ra lifetime	ipv6 nd ra-lifetime *seconds*	ARISTANDCA_BROCADE01785618
ipv6 nd reachable-time	ipv6 nd reachable-time milli *seconds*	ARISTANDCA_BROCADE01785618
ipv6 neighbor	ipv6 neighbor *ipv6address MACaddress*	ARISTANDCA_BROCADE01785618
ipv6 ospf area	ipv6 ospf area *area-id* | *ipv6-addr*	ARISTANDCA_BROCADE01785618
ipv6 ospf cost	ipv6 ospf cost *value*	ARISTANDCA_BROCADE01785618
ipv6 ospf dead-interval	ipv6 ospf dead-interval *interval*	ARISTANDCA_BROCADE01785618
ipv6 ospf hello-interval	ipv6 ospf hello-interval *interval*	ARISTANDCA_BROCADE01785618
ipv6 ospf network	ipv6 ospf network { broadcast | point-to-point }	ARISTANDCA_BROCADE01785618
ipv6 ospf priority	ipv6 ospf priority *value*	ARISTANDCA_BROCADE01785618
ipv6 ospf retransmit- interval	ipv6 ospf retransmit-interval *interval*	ARISTANDCA_BROCADE01785618
ipv6 ospf transmit-delay	ipv6 ospf transmit-delay *value*	ARISTANDCA_BROCADE01785618
ipv6 prefix-list	ipv6 prefix-list *name* { [deny *ipv6-prefix/prefix-length* | permit *ipv6-prefix/prefix-length*] ge *ge-value [le le-value]] | seq sequence-number }*	ARISTANDCA_BROCADE01785618
ipv6 route	ipv6 route *dest-ipv6-prefix/prefix-length* [*next-hop-ipv6-address* | *link-local-next-hop-ipv6-address*] [*<N>* gigabitethernet *slot/port* | null 0 | ve *vlan_id*] [*metric*] [distance *number*] [tag *tag*] ipv6 route ipv6-prefix/prefix-length next-hop-vrf vrf_name next-hop-ipv6-address	ARISTANDCA_BROCADE01785618
ipv6 router ospf	ipv6 router ospf [vrf *name*]	ARISTANDCA_BROCADE01785618
ipv6 unicast-routing	ipv6 unicast-routing	ARISTANDCA_BROCADE01363517
isis hello-interval	[no] isis hello-interval <num> [level-1-only | level-2-only]	ARISTANDCA_BROCADE00062898
isis hello-multiplier	[no] isis hello-multiplier <num> [level-1-only | level-2-only]	ARISTANDCA_BROCADE00062898
isis metric	You can change the metric value for a specific interface using the isis metric command or the isis ipv6 command. The isis metric command configuration takes precedence over the default-link metric *value* command configuration.	ARISTANDCA_BROCADE1530651
isis passive	[no] isis passive	ARISTANDCA_BROCADE00062898
isis priority	[no] isis priority <num> [level-1-only | level-2-only]	ARISTANDCA_BROCADE00062898
is-type	[no] is-type level-1-only | level-1-2 | level-2-only	ARISTANDCA_BROCADE00062898
lacp port-priority	lacp port-priority *value*	ARISTANDCA_BROCADE01785618
lacp system-priority	lacp system-priority *value*	ARISTANDCA_BROCADE01785618

APPENDIX H.BR - Brocade Usage of Disputed CLI Commands

lldp run	lldp run no lldp run	ARISTANDCA_BROCADE01363517
load-interval	statistics-load-interval { seconds | accumulated } load-interval <interval>	ARISTANDCA_BROCADE01530651, ARISTANDCA_BROCADE00062898
logging host	logging host { ipv4-addr | server-name | ipv6 ipv6-addr } [udp-port number]	ARISTANDCA_BROCADE01363517
log-adjacency-changes (IS-IS)	[no] log-adjacency-changes	ARISTANDCA_BROCADE00062898
mac access-group	mac access-group *ACLname* { in | out } [switched | routed]	ARISTANDCA_BROCADE01785618
mac-address-table aging-time	mac-address-table { aging-time *seconds* | conversational *aging_time* | learning-mode conversational }	ARISTANDCA_BROCADE01785618
mac-address-table static	mac-address-table static *mac-addr* forward { *<N>* gigabitethernet *rbridge-id/slot/port* | port-channel *number* | vlan *vlan_id* }	ARISTANDCA_BROCADE01785618
maximum-paths	maximum-paths *num* | use-load-sharing	ARISTANDCA_BROCADE01785618
maximum-paths (OSPFv3)	maximum-paths *num* no maximum-paths	ARISTANDCA_BROCADE01785618
neighbor activate	neighbor { *ip-address* | *ipv6-address* | *peer-group-name* } activate	ARISTANDCA_BROCADE01785618
neighbor default-originate	neighbor { *ip-address* | *ipv6-address* | *peer-group-name* } default-originate [route-map *map-name*]	ARISTANDCA_BROCADE01785618
neighbor description	neighbor { *ip-address* | *ipv6-address* | *peer-group-name* } description *string*	ARISTANDCA_BROCADE01785618
neighbor ebgp-multihop	neighbor { *ip-address* | *ipv6-address* | *peer-group-name* } ebgp-multiphop [*max-hop-count*]	ARISTANDCA_BROCADE01785618
neighbor local-as	neighbor { *ip-address* | *ipv6-address* | *peer-group-name* } local-as *num* [no-prepend]	ARISTANDCA_BROCADE01785618
neighbor next-hop-self	neighbor { *ip-address* | *ipv6-address* | *peer-group-name* } next-hop-self [always]	ARISTANDCA_BROCADE01785618
neighbor password	neighbor { *ip-address* | *ipv6-address* | *peer-group-name* } password *string*	ARISTANDCA_BROCADE01785618
neighbor peer-group (assigning members)	neighbor { *ip-address* | *ipv6-address* } peer-group *string*	ARISTANDCA_BROCADE01785618
neighbor peer-group (creating)	neighbor { *ip-address* | *ipv6-address* | *peer-group-name* } { activate |advertisement-interval | allowas-in |as-override | capability as4 | capability orf prefixlist default-originate ||description | ebgp-multihop | enforce-first-as | filter-list |local-as | maxas-limit in | maximum-prefix |next-hop- self | password | peer-group | prefix-list |remote-as | remove-private-as | route-map |route-reflector-client |send-community |shutdown | soft-reconfiguration | static-network-edge | timers | unsuppress-map | update-sourceweight }	ARISTANDCA_BROCADE01785618
neighbor remote-as	neighbor { *ip-address* | *ipv6-address* | *peer-group-name* } { activate |advertisement-interval | allowas-in |as-override | capability as4 | capability orf prefixlist default-originate ||description | ebgp-multihop | enforce-first-as | filter-list |local-as | maxas-limit in | maximum-prefix |next-hop- self | password | peer-group | prefix-list |remote-as | remove-private-as | route-map |route-reflector-client |send-community |shutdown | soft-reconfiguration | static-network-edge | timers | unsuppress-map | update-sourceweight }	ARISTANDCA_BROCADE01785618
neighbor remove-private-as	neighbor { *ip-address* | *ipv6-address* | *peer-group-name* } { activate |advertisement-interval | allowas-in |as-override | capability as4 | capability orf prefixlist default-originate ||description | ebgp-multihop | enforce-first-as | filter-list |local-as | maxas-limit in | maximum-prefix |next-hop- self | password | peer-group | prefix-list |remote-as | remove-private-as | route-map |route-reflector-client |send-community |shutdown | soft-reconfiguration | static-network-edge | timers | unsuppress-map | update-sourceweight }	ARISTANDCA_BROCADE01785618
neighbor route-map	neighbor { *ip-address* | *ipv6-address* | *peer-group-name* } route-map { in *string* | out *string* }	ARISTANDCA_BROCADE01785618
neighbor route-reflector-client	neighbor { *ip-address* | *ipv6-address* | *peer-group-name* } route-reflector-client	ARISTANDCA_BROCADE01785618
neighbor send-community	neighbor { *ip-address* | *ipv6-address* | *peer-group-name* } { activate |advertisement-interval | allowas-in |as-override | capability as4 | capability orf prefixlist default-originate ||description | ebgp-multihop | enforce-first-as | filter-list |local-as | maxas-limit in | maximum-prefix |next-hop- self | password | peer-group | prefix-list |remote-as | remove-private-as | route-map |route-reflector-client |send-community |shutdown | soft-reconfiguration | static-network-edge | timers | unsuppress-map | update-sourceweight }	ARISTANDCA_BROCADE01785618
neighbor shutdown	neighbor { *ip-address* | *ipv6-address* | *peer-group-name* } { activate |advertisement-interval | allowas-in |as-override | capability as4 | capability orf prefixlist default-originate ||description | ebgp-multihop | enforce-first-as | filter-list |local-as | maxas-limit in | maximum-prefix |next-hop- self | password | peer-group | prefix-list |remote-as | remove-private-as | route-map |route-reflector-client |send-community |shutdown | soft-reconfiguration | static-network-edge | timers | unsuppress-map | update-sourceweight }	ARISTANDCA_BROCADE01785618
neighbor soft-reconfiguration	neighbor { *ip-address* | *ipv6-address* | *peer-group-name* } { activate |advertisement-interval | allowas-in |as-override | capability as4 | capability orf prefixlist default-originate ||description | ebgp-multihop | enforce-first-as | filter-list |local-as | maxas-limit in | maximum-prefix |next-hop- self | password | peer-group | prefix-list |remote-as | remove-private-as | route-map |route-reflector-client |send-community |shutdown | soft-reconfiguration | static-network-edge | timers | unsuppress-map | update-source weight }	ARISTANDCA_BROCADE01785618
neighbor timers	neighbor { *ip-address* | *ipv6-address* | *peer-group-name* } { activate |advertisement-interval | allowas-in |as-override | capability as4 | capability orf prefixlist default-originate ||description | ebgp-multihop | enforce-first-as | filter-list |local-as | maxas-limit in | maximum-prefix |next-hop- self | password | peer-group | prefix-list |remote-as | remove-private-as | route-map |route-reflector-client |send-community |shutdown | soft-reconfiguration | static-network-edge | timers | unsuppress-map | update-source weight }	ARISTANDCA_BROCADE01785618

<table>
<tr><td>neighbor update-source</td><td>neighbor { ip-address | ipv6-address | peer-group-name } { activate |advertisement-interval | allowas-in |as-override | capability as4 | capability orf prefixlist default-originate ||description | ebgp-multihop | enforce-first-as | filter-list |local-as | maxas-limit in | maximum-prefix |next-hop- self | password | peer-group | prefix-list |remote-as | remove-private-as | route-map |route-reflector-client |send-community |shutdown | soft-reconfiguration | static-network-edge | timers | unsuppress-map | update-source weight }</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>neighbor weight</td><td>neighbor { ip-address | ipv6-address | peer-group-name } { activate |advertisement-interval | allowas-in |as-override | capability as4 | capability orf prefixlist default-originate ||description | ebgp-multihop | enforce-first-as | filter-list |local-as | maxas-limit in | maximum-prefix |next-hop- self | password | peer-group | prefix-list |remote-as | remove-private-as | route-map |route-reflector-client |send-community |shutdown | soft-reconfiguration | static-network-edge | timers | unsuppress-map | update-sourceweight }</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>no snmp-server</td><td>no snmp-server community string [groupname group-name] [ipv4-acl standard-ipv4-acl-name] [ipv6-acl standard-ipv6-acl-name]</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>ntp authentication-key</td><td>ntp authentication-key key-id {md5 md5-string | sha1 sha1-string }encryption-level enc_value</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>ntp server</td><td>ntp server ip-address [key key-id]</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>private-vlan</td><td>private-vlan [isolated | community | primary]</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>radius-server host</td><td>radius-server host { ip-address | host_name } [auth-port portnum] [protocol { chap | pap | peap }] [key shared_secret] [encryption-level value_level] [timeout sec] [retries num]</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>radius-server key</td><td>radius-server host { ip-address | host_name } [auth-port portnum] [protocol { chap | pap | peap }] [key shared_secret] [encryption-level value_level] [timeout sec] [retries num]</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>radius-server timeout</td><td>radius-server host { ip-address | host_name } [auth-port portnum] [protocol { chap | pap | peap }] [key shared_secret] [encryption-level value_level] [timeout sec] [retries num]</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>route-map</td><td>route-map name { permit | deny } instance_number</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>router bgp</td><td>router bgp</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>router isis</td><td>device(config)# router isis</td><td>ARISTANDCA_BROCADE01530651</td></tr>
<tr><td>router ospf</td><td>router ospf [vrf name]</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>router rip</td><td>device(config)# router rip</td><td>ARISTANDCA_BROCADE01530651</td></tr>
<tr><td>set-overload-bit</td><td>[no] set-overload-bit [on-startup <secs>]</td><td>ARISTANDCA_BROCADE00062898</td></tr>
<tr><td>show arp</td><td>show arp [dynamic[summary]] | <N> gigabitethernet rbridge-id/slot/port | ip ip-address | static [summary] | summary | ve vlan_id] [vrf name] [rbridge-id[all|rbridge_id]] | slot slot_no [[ip-address] | [vrf name] [ip-address]]</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>show clock</td><td>show clock [rbridge-id { rbridge-id | all }]</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>show dot1x</td><td>show dot1x</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>show dot1x statistics</td><td>show dot1x statistics interface [<N> gigabitethernet rbridge-id/slot/port]</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>show environment power</td><td>show environment power [rbridge-id { rbridge-id | all }]</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>show interfaces</td><td>show interface [fibrechannel rbridge-id/slot/port | management rbridge-id/slot/port | fcoe [vn- number/rbridge-id/front-port-number | rbridge-id rbridge-id] | <N> gigabitethernet rbridge-id/slot/port | loopback number | port-channel number | stats rbridge-id/slot/port | switchport | vlan vlan_id]</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>show inventory</td><td>show inventory [chassis | fan | module | powerSupply]</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>show ip access-lists</td><td>show access-list { ip | ipv6 | mac }
show ip access-list all | <acl-number> | begin <keyword> | exclude <keyword> | include <keyword></td><td>ARISTANDCA_BROCADE01785618
ARISTANDCA_BROCADE00062898</td></tr>
<tr><td>show ip bgp</td><td>show ip bgp { ip-addr [/prefix] } [longer-prefixes | rbridge-id { rbridge-id | all } | vrf vrf-name]</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>show ip bgp neighbors</td><td>show ip bgp neighbors ip-addr show ip bgp neighbors last-packet-with-error [rbridge-id { rbridge-id | all } | vrf vrf-name] show ip bgp neighbors routes-summary [rbridge-id { rbridge-id | all } | show ip bgp neighbors vrf vrf-namevrf vrf-name] show ip bgp neighbors rbridge-id { rbridge-id | all }</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>show ip bgp peer-group</td><td>show ip bgp peer-group peer-group-name [rbridge-id { rbridge-id | all } | vrf vrf-name]</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>show ip bgp summary</td><td>show ip bgp summary [rbridge-id { rbridge-id | all } | vrf vrf-name]</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>show ip extcommunity-list</td><td>show ip extcommunity-list [list_name [rbridge-id number] | rbridge-id list_name]</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>show ip igmp groups</td><td>show ip igmp groups [[[A.B.C.D [detail]] | rbridge-id { rbridge-id | all } | [interface [<N> gigabitethernet rbridge-id/slot/port | ve [vlan_id | rbridge-id rbridge-id] [detail | A.B.C.D]] | [interface vlan vlan_id | detail] | [interface port-channel number | detail]]]</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>show ip igmp interface</td><td>show ip igmp interface [vlan vlan_id [[A.B.C.D [detail]] | rbridge-id { rbridge-id | all } | [interface [<N>gigabitethernet rbridge-id/slot/port | ve [vlan_id | rbridge-id rbridge-id] [detail | A.B.C.D]] | [interface vlan vlan_id | detail] | [interface port-channel number | detail]]]</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>show ip igmp snooping</td><td>show ip igmp snooping [interface vlan vlan_id | mrouter interface vlan vlan_id]</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>show ip interface</td><td>show ip interface [brief [rbridge-id { rbridge-id | all }] | <N> gigabitethernet rbridge-id/slot/port | loopback number | port-channel number | ve vlan_id]</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>show ip interface brief</td><td>show ip interface [brief [rbridge-id { rbridge-id | all }] | <N> gigabitethernet rbridge-id/slot/port | loopback number | port-channel number | ve vlan_id]</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>show ip mroute</td><td>show ip mroute [vrf vrf-name] { static | connected | nexthop | ip-subnet [mask]}</td><td>ARISTANDCA_BROCADE01363517</td></tr>
<tr><td>show ip msdp peer</td><td>show ip msdp peer [vrf vrf-name] peer peer-address</td><td>ARISTANDCA_BROCADE01363517</td></tr>
</table>

APPENDIX H.BR - Brocade Usage of Disputed CLI Commands

show ip msdp sa-cache	show ip msdp [vrf vrf-name] sa-cache [counts] [source-address group-address | peer peer-address { in | out } | peer-as as-number | orig-rp rp-address | rejected [rpf | rp-filter | sg-filter] | self-originated]	ARISTANDCA_BROCADE01363517
show ip msdp summary	show ip msdp [vrf vrf-name] summary	ARISTANDCA_BROCADE01363517
show ip nat translations	show ip nat translation	ARISTANDCA_BROCADE00062898
show ip ospf	show ip ospf [vrf *name* [rbridge-id { *rbridge-id* | all }]]	ARISTANDCA_BROCADE01785618
show ip ospf border-routers	show ip ospf border-routers [*A.B.C.D*] [[vrf *vrfname* [rbridge-id { *rbridge-id* | all }]] | rbridge-id { rbridge-id | all }]	ARISTANDCA_BROCADE01785618
show ip ospf database database-summary	show ip ospf database database-summary [[vrf *vrfname* [rbridge-id { *rbridge-id* | all }]] | rbridge- id { *rbridge-id* | all }]	ARISTANDCA_BROCADE01785618
show ip ospf interface	show ip ospf interface [{ *A.B.C.D* | *<N>* gigabitethernet *rbridge-id/slot/port* [brief] | [brief] | loopback *number* | port-channel *number* [brief] | ve *vlan_id* [brief] } [brief]] [[vrf *vrfname* [rbridge-id { *rbridge-id* | all }]] | rbridge-id { *rbridge-id* | all }]	ARISTANDCA_BROCADE01785618
show ip ospf neighbor	show ip ospf neighbor [extensive] { *<N>* gigabitethernet *rbridge-id/slot/port* | loopback *number* | port-channel *number* | router-id *A.B.C.D* | ve *vlan_id* } [[vrf *vrfname* [rbridge-id { *rbridge-id* | all }]] | rbridge-id { *rbridge-id* | all }]	ARISTANDCA_BROCADE01785618
show ip pim interface	show ip pim interface { ethernet stackid/slot/port-id | loopback loopback number | ve ve-number }	ARISTANDCA_BROCADE01363517
show ip pim neighbor	show ip pim neighbor [interface *<N>* gigabitethernet *rbridge-id/slot/port*]	ARISTANDCA_BROCADE01785618
show ip pim rp-hash	show ip pim rp-hash *A.B.C.D* [rbridge-id { *rbridge-id* | all }]	ARISTANDCA_BROCADE01785618
show ip route	show ip route A.B.C.D [rbridge-id { rbridge-id | all } | vrf vrf-name] [rbridge-id { rbridge-id | all } show ip route A.B.C.D/M [longer] [rbridge-id { rbridge-id | all } | vrf vrf-name] [rbridge-id { rbridge- id | all } show ip route all [rbridge-id { rbridge-id | all } | vrf vrf-name] [rbridge-id { rbridge-id | all } show ip route bgp [rbridge-id { rbridge-id | all } | vrf vrf-name] [rbridge-id { rbridge-id | all } show ip route connected [rbridge-id { rbridge-id | all } | vrf vrf-name] [rbridge-id { rbridge-id | all } show ip route detail [rbridge-id { rbridge-id | all } | vrf vrf-name] [rbridge-id { rbridge-id | all } show ip route import [src-vrf-name] [rbridge-id { rbridge-id | all } | vrf vrf-name] [rbridge-id { rbridge-id | all } show ip route nexthop [nexthopID] [ref-routes] [rbridge-id { rbridge-id | all } | vrf vrf-name] [rbridge-id { rbridge-id | all } show ip route ospf [rbridge-id { rbridge-id | all } | vrf vrf-name] [rbridge-id { rbridge-id | all } show ip route rbridge-id {rbridge-id | all } [vrf vrf-name] [rbridge-id { rbridge-id | all } show ip route slot line_card_number [rbridge-id { rbridge-id | all } | vrf vrf-name] [rbridge-id { rbridge-id | all } show ip route static [rbridge-id { rbridge-id | all } | vrf vrf-name] [rbridge-id { rbridge-id | all } show ip route summary [rbridge-id { rbridge-id | all } | vrf vrf-name] [rbridge-id { rbridge-id | all } show ip route vrf vrf-name [rbridge-id { rbridge-id | all }	ARISTANDCA_BROCADE01785618
show ip route summary	show ip route summary [rbridge-id { rbridge-id | all } | vrf vrf-name] [rbridge-id { rbridge-id | all } show ip route vrf vrf-name [rbridge-id { rbridge-id | all }	ARISTANDCA_BROCADE01785618
show ipv6 access-list	show ipv6 access-list [acl-name]	ARISTANDCA_BROCADE01363517
show ipv6 bgp	show ipv6 bgp attribute-entries [rbridge-id { *rbridge-id* | all } | vrf *vrf-name*] show ipv6 bgp dampened-paths [rbridge-id { rbridge-id | all } | vrf vrf-name] show ipv6 bgp filtered-routes ipv6-addr mask [longer-prefixes [rbridge-id { rbridge-id | all }]] | rbridge-id { rbridge-id | all } | vrf vrf-name] show ipv6 bgp flap-statistics ipv6-addr mask [longer-prefixes [rbridge-id { rbridge-id | all }]] | rbridge-id { rbridge-id | all } | vrf vrf-name] show ipv6 bgp neighbors ipv6-addr show ipv6 bgp peer-group [peer-group-name [rbridge-id { rbridge-id | all }]] show ipv6 bgp rbridge-id { rbridge-id | all } [vrf vrf-name]	ARISTANDCA_BROCADE01785618
show ipv6 bgp summary	show ipv6 bgp summary [rbridge-id { *rbridge-id* | all } | vrf *vrf-name*]	ARISTANDCA_BROCADE01785618
show ipv6 interface	show ipv6 interface [brief [rbridge-id { all | *rbridge-id* }] | { *<N>* gigabitethernet *rbridge-id/slot/port* | ve vlan_id [rbridge-id { all | rbridge-id }] }	ARISTANDCA_BROCADE01785618
show ipv6 ospf interface	show ipv6 ospf interface [all-vrfs] [brief] [*<N>* gigabitethernet *mappedID/slot/port*] [loopback number] [rbridge-id rbridge-id] [ve vlan_id] [vrf vrfname]	ARISTANDCA_BROCADE01785618
show ipv6 ospf neighbor	show ipv6 ospf neighbor [all-vrfs] [detail] [interface { *<N>* gigabitethernet *rbridge-id/slot/port* | loopback number | ve vlan_id }] [rbridge-id rbridge-id] [router-id A.B.C.D] [vrf vrfname]	ARISTANDCA_BROCADE01785618
show ipv6 route	show ipv6 route [ipv6address/prefix] [longer] [rbridge-id { all | rbridge-id }] [vrf vrf-name] [rbridge-id { rbridge-id | all } show ipv6 route all [rbridge-id { all | rbridge-id }] [vrf vrf-name] [rbridge-id { rbridge-id | all } show ipv6 route bgp [rbridge-id { all | rbridge-id }] [vrf vrf-name] [rbridge-id { rbridge-id | all } show ipv6 route connected [rbridge-id { all | rbridge-id }] [vrf vrf-name] [rbridge-id { rbridge-id | all } show ipv6 route detail [rbridge-id { rbridge-id | all } | vrf vrf-name] [rbridge-id { rbridge-id | all } show ipv6 route import [src-vrf-name] [rbridge-id { all | rbridge-id }] [vrf vrf-name] [rbridge-id {rbridge-id | all } show ipv6 route nexthop [decimal | ref-routes [rbridge-id { all | rbridge-id }]] [vrf vrf-name] [rbridge-id { rbridge-id | all } show ipv6 route ospf [rbridge-id { all | rbridge-id }] [vrf vrf-name] [rbridge-id { rbridge-id | all } show ipv6 route rbridge-id { all | rbridge-id } [rbridge-id { rbridge-id | all } show ipv6 route slot slot [ipv6address | ipv6prefix | vrf vrf-name] [rbridge-id { rbridge-id | all } show ipv6 route static [rbridge-id { all | rbridge-id }] [vrf vrf-name] [rbridge-id { rbridge-id | all } show ipv6 route summary [rbridge-id { all | rbridge-id }] [vrf vrf-name] [rbridge-id { rbridge-id | all } show ipv6 route system-summary [rbridge-id { all | rbridge-id }] show ipv6 route vrf vrf-name [rbridge-id { all | rbridge-id }]	ARISTANDCA_BROCADE01785618

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<table>
<tr><td>show ipv6 route summary</td><td>show ipv6 route summary [rbridge-id { all | rbridge-id }] [vrf vrf-name] [rbridge-id { rbridge-id | all }</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>show isis database</td><td>show isis [config | counts | database [detail | level1 | level2 | summary] | hostname | interface [brief | ethernet | loopback | pos | ipv6 | tunnel | ve] | neighbor [detail] | routes ip-addr | shortcut [detail | lsp] | spf-log [detail | level1 | level2] | traffic]</td><td>ARISTANDCA_BROCADE1530651</td></tr>
<tr><td>show isis interface</td><td>show isis [config | counts | database [detail | level1 | level2 | summary] | hostname | interface [brief | ethernet | loopback | pos | ipv6 | tunnel | ve] | neighbor [detail] | routes ip-addr | shortcut [detail | lsp] | spf-log [detail | level1 | level2] | traffic]</td><td>ARISTANDCA_BROCADE1530651</td></tr>
<tr><td>show lacp counters</td><td>show lacp [counters [port-channel] | sys-id [port-channel]</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>show lldp</td><td>show lldp</td><td>ARISTANDCA_BROCADE01363517</td></tr>
<tr><td>show lldp neighbors</td><td>show lldp neighbors [detail ports { all | ethernet stack-id/slot/port [to stack-id/slot/port | [ethernet stack-id/slot/port to stack-id/slot/port | ethernet stack-id/slot/port] ...] }]</td><td>ARISTANDCA_BROCADE01363517</td></tr>
<tr><td>show mac-address-table</td><td>show mac-address-table [address mac-addr | aging-time [conversational [rbridge-id] rbridge-id]] | count [addressMAC_address | conversational linecard linecard_number [address [MAC_address | rbridge-id rbridge-id]] | interface {<N> gigabitethernet rbridge-id/slot/port | vlanvlan_id } | dynamic [address MAC_address | interface {<N> gigabitethernet rbridge-id/slot/port | port-channel number | tunnel number | vlan vlan_id] | interface { <N> gigabitethernet rbridge-id/slot/ port | port-channel number | tunnel number | vlan vlan_id } | static [address MAC_address | interface {<N> gigabitethernet rbridge-id/slot/port | port-channel number | tunnel number | vlan vlan_id] | vlan vlan_id | dynamic | interface | learning-mode [rbridge-id [rbridge-id]] | linecard interface |port-profile [addressMAC_address | count | dynamic | vlanvlan_id] | static | vlanvlan_id]</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>show mac-address-table aging time</td><td>show mac-address-table [address mac-addr | aging-time [conversational [rbridge-id] rbridge-id]] | count [addressMAC_address | conversational linecard linecard_number [address [MAC_address | rbridge-id rbridge-id]] | interface {<N> gigabitethernet rbridge-id/slot/port | vlanvlan_id } | dynamic [address MAC_address | interface {<N> gigabitethernet rbridge-id/slot/port | port-channel number | tunnel number | vlan vlan_id] | interface { <N> gigabitethernet rbridge-id/slot/ port | port-channel number | tunnel number | vlan vlan_id } | static [address MAC_address | interface {<N> gigabitethernet rbridge-id/slot/port | port-channel number | tunnel number | vlan vlan_id] | vlan vlan_id | dynamic | interface | learning-mode [rbridge-id [rbridge-id]] | linecard interface |port-profile [addressMAC_address | count | dynamic | vlanvlan_id] | static | vlanvlan_id]</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>show mac-address-table count</td><td>show mac-address-table [address mac-addr | aging-time [conversational [rbridge-id] rbridge-id]] | count [addressMAC_address | conversational linecard linecard_number [address [MAC_address | rbridge-id rbridge-id]] | interface {<N> gigabitethernet rbridge-id/slot/port | vlanvlan_id } | dynamic [address MAC_address | interface {<N> gigabitethernet rbridge-id/slot/port | port-channel number | tunnel number | vlan vlan_id] | interface { <N> gigabitethernet rbridge-id/slot/ port | port-channel number | tunnel number | vlan vlan_id } | static [address MAC_address | interface {<N> gigabitethernet rbridge-id/slot/port | port-channel number | tunnel number | vlan vlan_id] | vlan vlan_id | dynamic | interface | learning-mode [rbridge-id [rbridge-id]] | linecard interface |port-profile [addressMAC_address | count | dynamic | vlanvlan_id] | static | vlanvlan_id]</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>show monitor session</td><td>show monitor [session session_number]</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>show ntp status</td><td>show ntp status [rbridge-id { rbridge-id | all }]</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>show port-channel summary</td><td>show port-channel [channel-group-number | detail | load-balance | summary]</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>show port-security</td><td>show port-security</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>show port-security interface</td><td>show port-security interface [all | port-channel channel-group-number | <N> gigabitethernet rbridge-id/slot/port]</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>show qos maps</td><td>show qos maps [cos-mutation [name] | cos-traffic-class [name]]</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>show reload</td><td>show reload</td><td>ARISTANDCA_BROCADE00062898</td></tr>
<tr><td>show route-map</td><td>show route-map [name] [rbridge-id { rbridge-id | all }]</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>show snmp group</td><td>show snmp [engineid | group | server | user]</td><td>ARISTANDCA_BROCADE01363517</td></tr>
<tr><td>show snmp user</td><td>show snmp [engineid | group | server | user]</td><td>ARISTANDCA_BROCADE01363517</td></tr>
<tr><td>show spanning-tree</td><td>show spanning-tree [pvst | mst-config | vlan vlan_id]</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>show spanning-tree interface</td><td>show spanning-tree interface [port-channel number | <N> gigabitethernet rbridge-id/slot/port]</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>show spanning-tree mst interface</td><td>show spanning-tree mst instance i nstance_id [interface port-channel number | interface <N>gigabitethernet rbridge-id/slot/port]</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>show storm-control</td><td>show storm-control show storm-control broadcast [interface { <N>gigabitethernet } rbridge-id/slot/port] show storm-control multicast [interface { <N>gigabitethernet } rbridge-id/slot/port] show storm-control unknown-unicast [interface { <N>gigabitethernet } rbridge-id/slot/port]</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>show users</td><td>show users [rbridge-id { rbridge-id | all }]</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>show version</td><td>show version [rbridge-id { rbridge-id | all }] [all-partitions] [brief]</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>show vlan</td><td>show vlan [vlan_id | brief [provisioned | unprovisioned] | classifier]</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>show vlan private-vlan</td><td>show vlan private-vlan</td><td>ARISTANDCA_BROCADE01785618</td></tr>
<tr><td>show vrf</td><td>show vrf [vrf-name | detail | interface] [rbridge-id { rbridge-id | all }]</td><td>ARISTANDCA_BROCADE01785618</td></tr>
</table>

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show vrrp	show vrrp show vrrp VRID [detail | summary] [rbridge-id { rbridge-id | all }] show vrrp detail [rbridge-id { rbridge-id | all }] show vrrp summary [vrf { vrf-name | all } | rbridge-id { rbridge-id | all }] show vrrp summary vrf default-vrf show vrrp interface { <N>gigabitethernet [rbridge-id /] slot/port [detail | summary] | ve vlan_id [detail | summary | rbridge-id] } show vrrp rbridge-id { rbridge-id | all }	ARISTANDCA_BROCADE01785618
snmp-server community	snmp-server community *string* [groupname *group-name*] [ipv4-acl *standard-ipv4-acl-name*] [ipv6- acl *standard-ipv6-acl-name*]	ARISTANDCA_BROCADE01785618
snmp-server contact	snmp-server contact *string*	ARISTANDCA_BROCADE01785618
snmp-server enable traps	snmp-server enable trap	ARISTANDCA_BROCADE01785618
snmp-server engineID local	snmp-server engineid local *engine_id*	ARISTANDCA_BROCADE01785618
snmp-server group	snmp-server group *groupname* {v1 | v2c | v3 {auth | noauth | priv}} [read *viewname*] [write *viewname*] [notify *viewname*]	ARISTANDCA_BROCADE01785618
snmp-server host	snmp-server host { ipv4_host | ipv6_host | dns_host } *community_string* [version { 1 | 2c }] [udp- port *port*] [severity-level | { none | debug | info | warning | error | critical }] [source-interface { loopback*number* |ve *vlan_id* }] [use-vrf { mgmt-vrf | default-vrf }]	ARISTANDCA_BROCADE01785618
snmp-server location	snmp-server location *string*	ARISTANDCA_BROCADE01785618
snmp-server user	snmp-server user *username* [groupname *group-name*] [auth { md5 | sha | noauth }] [auth- password *string* [encrypted]] [priv { DES | AES128 | nopriv }] [priv-password *string* [encrypted]] [ipv4-acl *standard-ipv4-acl-name*] [ipv6-acl *standard-ipv6-acl-name*]	ARISTANDCA_BROCADE01785618
snmp-server view	snmp-server view *view-name mib_tree* {included | excluded}	ARISTANDCA_BROCADE01785618
spanning-tree cost	spanning-tree cost *cost*	ARISTANDCA_BROCADE01785618
spanning-tree link-type	spanning-tree link-type [point-to-point | shared]	ARISTANDCA_BROCADE01785618
spanning-tree vlan	spanning-tree vlan *vlan_id*	ARISTANDCA_BROCADE01785618
spf-interval	[no] spf-interval <secs>	ARISTANDCA_BROCADE00062898
switchport access vlan	switchport access { vlan *vlan_id* | rspan-vlan *vlan_id* | mac *HHHH.HHHH.HHHH* | mac-group *mac- group-id* }	ARISTANDCA_BROCADE01785618
switchport mode	switchport mode { access | trunk }	ARISTANDCA_BROCADE01785618
switchport port-security	switchport port-security mac-address *address* vlan *vlan_id* *switchport port-security max* *switchport port-security oui* *switchport port-security shutdown-time* *switchport port-security sticky* *switchport port-security violation*	ARISTANDCA_BROCADE01785618
switchport private-vlan mapping	switchport private-vlan mapping *primary_vlan_ID* [add | remove] *secondary_vlan*	ARISTANDCA_BROCADE01785618
switchport trunk allowed vlan	switchport trunk allowed { vlan | rspan-vlan } { add *vlan_id* { ctag { *id* | *ctag -range* } | all | except vlan_id | none | remove vlan_id }	ARISTANDCA_BROCADE01785618
switchport trunk native vlan	switchport trunk native-vlan *vlan_id* [ctag *id*]	ARISTANDCA_BROCADE01785618
tacacs-server host	tacacs-server {host *hostname* | source-ip [*chassis-ip* | *mm-ip*] } [port *portnum*] [protocol { chap | pap }] [key shared_secret] [encryption-level value_level] [timeout secs] [retries num]	ARISTANDCA_BROCADE01785618
tacacs-server key	tacacs-server {host *hostname* | source-ip [*chassis-ip* | *mm-ip*] } [port *portnum*] [protocol { chap | pap }] [key shared_secret] [encryption-level value_level] [timeout secs] [retries num]	ARISTANDCA_BROCADE01785618
tacacs-server timeout	tacacs-server {host *hostname* | source-ip [*chassis-ip* | *mm-ip*] } [port *portnum*] [protocol { chap | pap }] [key shared_secret] [encryption-level value_level] [timeout secs] [retries num]	ARISTANDCA_BROCADE01785618
terminal length	terminal [length *number_of_lines*] [monitor] [timeout *value*]	ARISTANDCA_BROCADE01785618
terminal monitor	terminal [length *number_of_lines*] [monitor] [timeout *value*]	ARISTANDCA_BROCADE01785618
timers basic (RIP)	[no] timers-basic <update-timer> <aging-timeout-interval> <garbage-collection-timer>	ARISTANDCA_BROCADE01363517 ARISTANDCA_BROCADE00062898
timers throttle spf	timers { lsa-group-pacing *interval* | throttle spf *start hold max* }	ARISTANDCA_BROCADE01785618

EXHIBIT E

APPENDIX H.DE - Dell Usage of Disputed CLI Commands

Disputed Cisco Command	Dell Command Syntax	Dell Manual Bates Number
aaa accounting	aaa accounting {exec | commands | dot1x} {default | list_name} {startstop | stop-only |none} [method1 [method2…]] {radius|tacacs|radius I tacacs|tacacs radius}	DELL-ANETSUB00131695
aaa accounting dot1x	aaa accounting {exec | commands | dot1x} {default | list_name} {start- stop | stop-only |none} [method1 [method2…]] {radius|tacacs|radius tacacs|tacacs radius}	DELL-ANETSUB00131695
aaa authentication login	aaa authentication login {default | list-name} method1 [method2...]	DELL-ANETSUB00131695
aaa authorization config-commands	aaa authorization {commands|exec|network}{default|list-name} method1 [method2]	DELL-ANETSUB00131695
address-family	address-family { ipv4 | ipv6 }	DELL-ANETSUB00131695
aggregate-address	aggregate-address { ipv4-prefix mask | ipv6-prefix/prefix-length } [as-set] [summary-only]	DELL-ANETSUB00131695
area default-cost	area *areaid* default-cost *1-16777215*	DELL-ANETSUB00026077
area default-cost (OSPFv3)	area area-id default-cost cost	DELL-ANETSUB00131695
area nssa	area area-id nssa [no-redistribution] [default-information-originate [metric metric-value] [metric-type metric-type-value]] [no-summary] [translator- role role] [translator-stab-intv interval]	DELL-ANETSUB00131695
area nssa (OSPFv3)	area area-id nssa [no-redistribution] [default-information-originate [metric metric-value] [metric-type metric-type-value]] [no-summary] [translator- role role] [translator-stab-intv interval]	DELL-ANETSUB00131695
area nssa default-information-originate	area area-id nssa [no-redistribution] [default-information-originate [metric metric-value] [metric-type metric-type-value]] [no-summary] [translator- role role] [translator-stab-intv interval]	DELL-ANETSUB00131695
area nssa default-information-originate (OSPFv3)	area area-id nssa [no-redistribution] [default-information-originate [metric metric-value] [metric-type metric-type-value]] [no-summary] [translator- role role] [translator-stab-intv interval]	DELL-ANETSUB00131695
area nssa no-summary	area area-id nssa [no-redistribution] [default-information-originate [metric metric-value] [metric-type metric-type-value]] [no-summary] [translator- role role] [translator-stab-intv interval]	DELL-ANETSUB00131695
area range	area area-id range prefix netmask {summarylink | nssaexternallink} [advertise | not-advertise][cost cost]	DELL-ANETSUB00131695
area range (OSPFv3)	area area-id range prefix netmask {summarylink | nssaexternallink} [advertise | not-advertise][cost cost]	DELL-ANETSUB00131695
area stub	area area-id stub	DELL-ANETSUB00131695
area stub (OSPFv3)	area area-id stub	DELL-ANETSUB00131695
arp timeout	arp timeout integer	DELL-ANETSUB00131695
banner login	banner login Message	DELL-ANETSUB00131695
banner motd	banner motd MESSAGE	DELL-ANETSUB00131695
bgp client-to-client reflection	bgp client-to-client reflection	DELL-ANETSUB00131695
bgp cluster-id	bgp cluster-id cluster-id	DELL-ANETSUB00131695
bgp confederation identifier	bgp confederation identifier *as-number*	DELL-ANETSUB00019535
bgp confederation peers	bgp confederation peers *as-number* [*...as-number*]	DELL-ANETSUB00019535
bgp log-neighbor-changes	bgp log-neighbor-changes	DELL-ANETSUB00131695
boot system	boot system [unit-id][active|backup]	DELL-ANETSUB00131695
channel-group	channel-group port-channel-number mode {on | active}	DELL-ANETSUB00131695
clear arp-cache	clear arp-cache [vrf vrf-name] [gateway]	DELL-ANETSUB00131695
clear counters	clear counters [vrf vrf-name | stack-ports | switchport | interface-id]	DELL-ANETSUB00131695
clear ip bgp	clear ip bgp {* | as-number | ipv4-address | ipv6-address [interface interface-id] } [soft [in | out]]	DELL-ANETSUB00131695
clear ipv6 neighbors	clear ipv6 neighbors [vlan vlan-id]	DELL-ANETSUB00131695
clear lldp counters	clear lldp counters *interface*	DELL-ANETSUB00019535
clear lldp table	clear lldp table [interface-id]	DELL-ANETSUB00114148
clock set	clock set *time month day year*	DELL-ANETSUB00019535
clock timezone	clock timezone *timezone-name offset*	DELL-ANETSUB00019535
default-information originate (OSPF)	default-information originate [always] [metric *metric-value*] [metric-type *type-value*	DELL-ANETSUB00019535
default-information originate (OSPFv3)	default-information originate [always]	DELL-ANETSUB00131695
default-metric (OSPF)	default-metric *number*	DELL-ANETSUB00019535
default-metric (OSPFv3)	default-metric metric-value	DELL-ANETSUB00131695
distance bgp	distance bgp *external-distance internal-distance local-distance*	DELL-ANETSUB00019535
dot1x port-control	dot1x port-control {force-authorized | auto | force-unauthorized}	DELL-ANETSUB00019535
dot1x reauthentication	dot1x reauthentication [interval *seconds*]	DELL-ANETSUB00019535
dot1x system-auth-control	dot1x system-auth-control	DELL-ANETSUB00131695
dot1x timeout quiet-period	dot1x timeout quiet-period seconds	DELL-ANETSUB00131695
dot1x timeout reauth-period	dot1x timeout re-authperiod seconds	DELL-ANETSUB00131695
dot1x timeout tx-period	dot1x timeout tx-period seconds	DELL-ANETSUB00131695
interface loopback	interface loopback *number*	DELL-ANETSUB00019535
interface port-channel	interface port-channel *channel-number*	DELL-ANETSUB00019535
interface vlan	interface vlan *vlan-id*	DELL-ANETSUB00019535
ip access-group	ip access-group *access-list-name* {in | out} [implicit-permit] [vlan *vlan-id*]	DELL-ANETSUB00019535
ip access-list	ip access-list standard *access-list-name // ip access-list extended access-list-name*	DELL-ANETSUB00019535
ip address	ip address *ip-address mask* [secondary]	DELL-ANETSUB00019535
ip as-path access-list	ip as-path access-list *as-path-name*	DELL-ANETSUB00019535
ip dhcp snooping	[no] ip dhcp snooping	DELL-ANETSUB00019535
ip dhcp snooping vlan	[no] ip dhcp snooping vlan *name*	DELL-ANETSUB00019535
ip domain lookup	ip domain-lookup	DELL-ANETSUB00131695
ip domain-name	ip domain-name *name*	DELL-ANETSUB00019535

APPENDIX H.DE - Dell Usage of Disputed CLI Commands

ip helper-address	ip helper-address *ip-address* | *default-vrf*	DELL-ANETSUB00019535
ip host	ip host *name ip-address*	DELL-ANETSUB00019535
ip igmp last-member-query-count	ip igmp last-member-query-count lmqc	DELL-ANETSUB00131695
ip igmp last-member-query-interval	ip igmp last-member-query-interval *milliseconds*	DELL-ANETSUB00019535
ip igmp query-interval	ip igmp query-interval *seconds*	DELL-ANETSUB00019535
ip igmp query-max-response-time	ip igmp query-max-response-time seconds	DELL-ANETSUB00131695
ip igmp snooping	ip igmp snooping enable	DELL-ANETSUB00019535
ip igmp snooping querier	ip igmp snooping querier	DELL-ANETSUB00019535
ip igmp snooping vlan	ip igmp snooping vlan vlan-id mrouter interface interface-id // ip igmp snooping vlan vlan-id last-member-query-interval time // ip igmp snooping vlan vlan-id mcrtexpiretime time // ip igmp snooping vlan vlan-id groupmembership-interval time	DELL-ANETSUB00131695
ip igmp snooping vlan immediate-leave	ip igmp snooping vlan vlan-id immediate-leave	DELL-ANETSUB00131695
ip igmp startup-query-count	ip igmp startup-query-count count	DELL-ANETSUB00131695
ip igmp startup-query-interval	ip igmp startup-query-interval seconds	DELL-ANETSUB00131695
ip igmp version	ip igmp version {2 | 3}	DELL-ANETSUB00019535
ip msdp default-peer	ip msdp default-peer *peer address* [list *name*]	DELL-ANETSUB00019535
ip msdp mesh-group	ip msdp mesh-group {*name* } {*peer address* }	DELL-ANETSUB00019535
ip msdp originator-id	ip msdp originator-id {*interface* }	DELL-ANETSUB00019535
ip msdp peer	ip msdp peer *peer address* [connect-source] [description] [sa-limit *number*]	DELL-ANETSUB00019535
ip msdp sa-filter in	ip msdp sa-filter {in | out} *peer-address* list [*access-list name*]	DELL-ANETSUB00019535
ip msdp sa-filter out	ip msdp sa-filter {in | out} *peer-address* list [*access-list name*]	DELL-ANETSUB00019535
ip msdp sa-limit	ip msdp sa-limit *number*	DELL-ANETSUB00019535
ip msdp shutdown	ip msdp shutdown {*peer address* }	DELL-ANETSUB00019535
ip name-server	ip name-server *ipv4-address* [*ipv4-address2 ...ipv4-address6*]	DELL-ANETSUB00019535
ip ospf authentication	ip ospf authentication {none | {simple key} | {encrypt key key-id}}	DELL-ANETSUB00131695
ip ospf authentication-key	ip ospf authentication-key [*encryption-type*] *key*	DELL-ANETSUB00019535
ip ospf cost	ip ospf cost *cost*	DELL-ANETSUB00019535
ip ospf dead-interval	ip ospf dead-interval *seconds*	DELL-ANETSUB00019535
ip ospf hello-interval	ip ospf hello-interval *seconds*	DELL-ANETSUB00019535
ip ospf network	ip ospf network {broadcast | point-to-point}	DELL-ANETSUB00019535
ip ospf priority	ip ospf priority *number*	DELL-ANETSUB00019535
ip ospf retransmit-interval	ip ospf retransmit-interval *seconds*	DELL-ANETSUB00019535
ip ospf transmit-delay	ip ospf transmit-delay *seconds*	DELL-ANETSUB00019535
ip pim dr-priority	ip pim dr-priority *priority-value*	DELL-ANETSUB00019535
ip prefix-list	ip prefix-list *prefix-name*	DELL-ANETSUB00019535
ip proxy-arp	ip proxy-arp	DELL-ANETSUB00019535
ip radius source-interface	ip radius source-interface *interface*	DELL-ANETSUB00019535
ip route	ip route *vrf {vrf instance} destination mask* {*ip-address* | *interface* [*ip-address*]} [*distance*] [permanent] [tag tag-value]	DELL-ANETSUB00019535
ip routing	ip routing	DELL-ANETSUB00131695
ipv6 access-list	ipv6 access-list *access-list-name*	DELL-ANETSUB00019535
ipv6 address	ipv6 address {*ipv6-address prefix-length* }	DELL-ANETSUB00019535
ipv6 host	ipv6 host *name ip-address*	DELL-ANETSUB00019535
ipv6 nd prefix	ipv6 nd prefix {*ipv6-address* /*prefix-length* > | default} [no-advertise] | [no-autoconfig] [no-rtr-address] [off-link] [lifetime {*valid* | infinite} {*preferred* | infinite}]	DELL-ANETSUB00019535
ipv6 neighbor	ipv6 neighbor {*ipv6-address* } {interface *interface* } {*hardware_address* }	DELL-ANETSUB00019535
ipv6 ospf area	ipv6 ospf *process-id* area *area-id*	DELL-ANETSUB00019535
ipv6 ospf cost	ipv6 ospf cost *interface-cost*	DELL-ANETSUB00019535
ipv6 ospf dead-interval	ipv6 ospf dead-interval *seconds*	DELL-ANETSUB00019535
ipv6 ospf hello-interval	ipv6 ospf hello-interval *seconds*	DELL-ANETSUB00019535
ipv6 ospf priority	ipv6 ospf priority *number*	DELL-ANETSUB00019535
ipv6 prefix-list	ipv6 prefix-list list-name { [seq seq-number] {permit|deny} ipv6- prefix/prefix-length [ge ge-value] [le le-value] | description text | renumber renumber-interval first-statement-number }	DELL-ANETSUB00131695
ipv6 route	ipv6 route *ipv6-address prefix-length* {*interface* | *ipv6-address* } [*distance*] [tag *value*] [permanent]	DELL-ANETSUB00019535
ipv6 router ospf	ipv6 router ospf *process-id*	DELL-ANETSUB00019535
ipv6 unicast-routing	ipv6 unicast-routing	DELL-ANETSUB00019535
isis hello-multiplier	isis hello-multiplier *multiplier* [level-1 | level-2]	DELL-ANETSUB00019535
isis metric	isis metric *default-metric* [level-1 | level-2]	DELL-ANETSUB00019535
isis priority	isis priority *value* [level-1 | level-2]	DELL-ANETSUB00019535
is-type	is-type {level-1 | level-1-2 | level-2-only}	DELL-ANETSUB00019535
lacp port-priority	lacp port-priority *priority-value*	DELL-ANETSUB00019535
lacp system-priority	lacp system-priority *priority-value*	DELL-ANETSUB00019535
lldp receive	lldp receive	DELL-ANETSUB00131695
lldp reinit	lldp reinit-delay seconds	DELL-ANETSUB00122372
lldp run	lldp run no lldp run	DELL-ANETSUB00114148
lldp timer	lldp timers [interval *transmit-interval*] [hold *hold-multiplier*] [reinit *reinit- delay*]	DELL-ANETSUB00131695
lldp transmit	lldp transmit	DELL-ANETSUB00131695
log-adjacency-changes	log-adjacency-changes	DELL-ANETSUB00019535
log-adjacency-changes (IS-IS)	log-adjacency-changes	DELL-ANETSUB00019535
log-adjacency-changes (OSPFv3)	log-adjacency-changes	DELL-ANETSUB00019535

APPENDIX H.DE - Dell Usage of Disputed CLI Commands

logging host	logging host host_ip_address	DELL-ANETSUB00095249
mac access-group	mac access-group *access-list-name* {in [vlan *vlan-range*] | out}	DELL-ANETSUB00019535
mac access-list	mac access-list standard *mac-list-name // mac access-list extended access-list-name*	DELL-ANETSUB00019535
mac-address	mac-address *mac-address*	DELL-ANETSUB00026077
mac-address-table aging-time	mac-address-table aging-time *seconds*	DELL-ANETSUB00019535
mac-address-table static	mac-address-table static *mac-address* output *interface* vlan *vlan-id*	DELL-ANETSUB00019535
maximum-paths	maximum-paths {ebgp | ibgp} *number // maximum-paths number*	DELL-ANETSUB00019535
maximum-paths (OSPFv3)	maximum-paths *number*	DELL-ANETSUB00019535
neighbor activate	neighbor [*ip-address* | *peer-group-name*] activate	DELL-ANETSUB00019535
neighbor allowas-in	neighbor {*ip-address* | *peer-group-name*} allowas-in *number*	DELL-ANETSUB00019535
neighbor default-originate	neighbor {*ip-address* | *peer-group-name*} default-originate [route-map *map-name*]	DELL-ANETSUB00019535
neighbor description	neighbor {*ip-address* | *peer-group-name*} description *text*	DELL-ANETSUB00019535
neighbor ebgp-multihop	neighbor {*ipv6-address* | *peer-group-name*} ebgp-multihop [*ttl*]	DELL-ANETSUB00019535
neighbor local-as	neighbor {*ip-address* | *peer-group-name*} local-as *as -number* [no-prepend]	DELL-ANETSUB00019535
neighbor next-hop-self	neighbor {*ip-address* | *peer-group-name*} next-hop-self	DELL-ANETSUB00019535
neighbor password	neighbor {*ip-address* | *peer-group-name*} password [*encryption-type*] *password*	DELL-ANETSUB00019535
neighbor peer-group (assigning members)	neighbor *ip-address* peer-group *peer-group-name*	DELL-ANETSUB00019535
neighbor peer-group (creating)	neighbor *peer-group-name* peer-group	DELL-ANETSUB00019535
neighbor remote-as	neighbor {*ip-address* | *peer-group-name*} remote-as *number*	DELL-ANETSUB00019535
neighbor remove-private-as	neighbor {*ip-address* | *peer-group-name*} remove-private-as	DELL-ANETSUB00019535
neighbor route-map	neighbor {*ip-address* | *peer-group-name*} route-map *map-name* {in | out}	DELL-ANETSUB00019535
neighbor route-reflector-client	neighbor {*ip-address* | *peer-group-name*} route-reflector-client	DELL-ANETSUB00019535
neighbor shutdown	neighbor {*ip-address* | *peer-group-name*} shutdown	DELL-ANETSUB00019535
neighbor timers	neighbor {*ip-address* | *peer-group-name*} timers *keepalive holdtime*	DELL-ANETSUB00019535
neighbor update-source	neighbor {*ip-address* | *peer-group-name*} update-source *interface*	DELL-ANETSUB00019535
neighbor weight	neighbor {*ip-address* | *peer-group-name*} weight *weight*	DELL-ANETSUB00019535
passive-interface	passive-interface *interface*	DELL-ANETSUB00019535
passive-interface (OSPFv3)	passive-interface {default | *interface*}	DELL-ANETSUB00019535
port-channel load-balance	port-channel load-balance {layer-2 | layer-2-3 | layer-2-3-4}	DELL-ANETSUB00122372
private-vlan	[no] private-vlan mode {community | isolated | primary}	DELL-ANETSUB00019535
radius-server deadtime	radius-server deadtime deadtime	DELL-ANETSUB00131695
radius-server host	radius-server host {*hostname* | *ipv4-address* | *ipv6-address*} [auth-port *port-number*] [retransmit retries] [timeout seconds] [key [encryption-type] key]	DELL-ANETSUB00019535
radius-server key	radius-server key [*encryption-type*] *key*	DELL-ANETSUB00019535
radius-server retransmit	radius-server retransmit *retries*	DELL-ANETSUB00019535
radius-server timeout	radius-server timeout *seconds*	DELL-ANETSUB00019535
route-map	route-map *map-name*	DELL-ANETSUB00019535
router bgp	router bgp *as-number*	DELL-ANETSUB00019535
router isis	ip router isis [*tag*] // ipv6 router isis [tag]	DELL-ANETSUB00019535
router ospf	router ospf *process-id [* vrf *{vrf name}]*	DELL-ANETSUB00019535
router rip	router rip	DELL-ANETSUB00019535
router-id	router-id *ip-address*	DELL-ANETSUB00019535
router-id (OSPFv3)	router-id *ip-address*	DELL-ANETSUB00019535
set-overload-bit	set-overload-bit	DELL-ANETSUB00019535
show arp	show arp [vrf *vrf name*] [interface *interface* | ip *ip-address* [*mask*] | macaddress mac-address [mac-address mask]] [cpu {cp | rp1 | rp2}] [static | dynamic] [summary]	DELL-ANETSUB00019535
show bfd neighbors	show bfd neighbors *interface* [detail]	DELL-ANETSUB00019535
show clock	show clock [detail]	DELL-ANETSUB00019535
show dot1q-tunnel	show dot1q-tunnel [interface interface-id]	DELL-ANETSUB00131695
show dot1x	show dot1x [interface interface-id [statistics]]	DELL-ANETSUB00131695
show dot1x statistics	show dot1x [interface interface-id [statistics]]	DELL-ANETSUB00131695
show environment all	show environment [all | fan | linecard | linecard-voltage | PEM | RPM | SFM]	DELL-ANETSUB00019535
show hosts	show hosts	DELL-ANETSUB00019535
show interfaces	show interfaces *interface*	DELL-ANETSUB00019535
show interfaces description	show interfaces [*interface*] description	DELL-ANETSUB00019535
show interfaces status	show interfaces [*interface* | linecard *slot-number*] status	DELL-ANETSUB00019535
show interfaces switchport	show interfaces switchport [*interface* [linecard *slot-number*] | stack-unit *unit-id*]	DELL-ANETSUB00019535
show interfaces switchport backup	show interfaces [gigabitethernet | tengigabitethernet] slot/port transceiver Enter the keyword backup to view the backup interface for this interface.	DELL-ANETSUB00019535
show interfaces transceiver	show interfaces [gigabitethernet | tengigabitethernet] *slot/port* transceiver	DELL-ANETSUB00019535
show inventory	show inventory [media *slot*]	DELL-ANETSUB00019535
show ip access-lists	show ip access-lists [*access-list-name*] [interface *interface*] [in |out]	DELL-ANETSUB00019535
show ip bgp	show ip bgp *[ipv4 unicast]* [*network* [*network-mask*] [longer-prefixes]]	DELL-ANETSUB00019535
show ip bgp community	show ip bgp *[ipv4 unicast]* community [*community-number*] [local-as] [no-export] [no-advertise]	DELL-ANETSUB00019535
show ip bgp neighbors	show ip bgp [ipv4 unicast] neighbors [*ipv4-neighbor-addr* | *ipv6-neighbor-addr*] [advertised-routes | dampened-routes | detail | flap-statistics | routes | {received-routes [*network* [*network-mask*]] | {denied-routes [*network* [*network-mask*]]}]	DELL-ANETSUB00019535
show ip bgp paths	show ip bgp paths [regexp *regular-expression*]	DELL-ANETSUB00019535

APPENDIX H.DE - Dell Usage of Disputed CLI Commands

show ip bgp peer-group	show ip bgp *[ipv4 unicast]* peer-group [*peer-group-name* [detail | summary]]	DELL-ANETSUB00019535
show ip bgp regexp	show ip bgp regexp *regular-expression* [*character*]	DELL-ANETSUB00019535
show ip bgp summary	show ip bgp *[ipv4 unicast]* summary	DELL-ANETSUB00019535
show ip dhcp snooping	show ip dhcp snooping [binding | source-address-validation]	DELL-ANETSUB00019535
show ip helper-address	show ip helper-address [vrf vrf-name][intf-address]	DELL-ANETSUB00131695
show ip igmp groups	show ip igmp groups [*group-address* [detail] | detail | *interface* [*group-address* [detail]]]	DELL-ANETSUB00019535
show ip igmp interface	show ip igmp interface [*interface*]	DELL-ANETSUB00019535
show ip igmp snooping groups	show ip igmp snooping groups [vlan vlan-id] [address ip-multicast-address]	DELL-ANETSUB00131695
show ip igmp snooping mrouter	show ip igmp snooping mrouter [vlan *number*]	DELL-ANETSUB00019535
show ip interface	show ip interface [*interface* | brief | linecard *slot-number*] [configuration]	DELL-ANETSUB00019535
show ip interface brief	show ip interface [*interface* | brief | linecard *slot-number*] [configuration]	DELL-ANETSUB00019535
show ip ospf	show ip ospf *process-id [* vrf *vrf name]*	DELL-ANETSUB00019535
show ip ospf interface	show ip ospf *process-id* interface [*interface*]	DELL-ANETSUB00019535
show ip ospf neighbor	show ip ospf *process-id* neighbor	DELL-ANETSUB00019535
show ip pim interface	show ip pim interface	DELL-ANETSUB00019535
show ip pim neighbor	show ip pim neighbor	DELL-ANETSUB00019535
show ip pim rp	show ip pim rp [mapping | *group-address*]	DELL-ANETSUB00019535
show ip rip database	show ip rip database [*ip-address mask*]	DELL-ANETSUB00019535
show ip route	show ip route *[vrf [vrf name] hostname* | *ip-address* [*mask*] [longer-prefixes] | list *prefix-list* | protocol [process-id | routing-tag] | all | connected | static | summary]	DELL-ANETSUB00019535
show ip route summary	show ip route summary	DELL-ANETSUB00019535
show ipv6 interface	show ipv6 interface *interface* [brief] [configured] [gigabitethernet *slot* | *slot/port*] [linecard *slot-number*] [loopback *interface-number*] [managementethernet *slot/port*] [port-channel *number*] [tengigabitethernet *slot* | *slot/port*] [vlan *vlan-id*]	DELL-ANETSUB00019535
show ipv6 neighbors	show ipv6 neighbors [*ipv6-address*] [cpu {rp1 [*ipv6-address*] | rp2 [*ipv6-address*]}] [interface *interface*]	DELL-ANETSUB00019535
show ipv6 ospf interface	show ipv6 ospf [*interface*]	DELL-ANETSUB00019535
show ipv6 ospf neighbor	show ipv6 ospf neighbor [*interface*]	DELL-ANETSUB00019535
show ipv6 route	show ipv6 route [*ipv6-address prefix-length*] [hostname] [all] [bgp as number] [connected] [isis tag] [list prefix-list name] [ospf process-id] [rip] [static] [summary]	DELL-ANETSUB00019535
show ipv6 route summary	show ipv6 route [*ipv6-address prefix-length*] [hostname] [all] [bgp as number] [connected] [isis tag] [list prefix-list name] [ospf process-id] [rip] [static] [summary]	DELL-ANETSUB00019535
show isis database	show isis database [level-1 | level-2] [local] [detail | summary] [*lspid*]	DELL-ANETSUB00019535
show isis interface	show isis interface [*interface*]	DELL-ANETSUB00019535
show lacp counters	show lacp *port-channel-number* [sys-id | counters]	DELL-ANETSUB00019535
show lldp neighbors	show lldp neighbors [*interface*] [detail]	DELL-ANETSUB00019535
show mac access-lists	show mac access-lists [*access-list-name*] [interface *interface*] [in | out]	DELL-ANETSUB00019535
show mac-address-table	show mac-address-table [dynamic | static] [address *mac-address* | interface *interface* | vlan *vlan-id*] [count [vlan *vlan-id*] [interface *interface-type* [*slot* [*/port*]]]]	DELL-ANETSUB00019535
show mac-address-table aging time	show mac-address-table aging-time [vlan *vlan-id*]	DELL-ANETSUB00019535
show mac-address-table count	show mac-address-table [dynamic | static] [address *mac-address* | interface *interface* | vlan *vlan-id*] [count [vlan *vlan-id*] [interface *interface-type* [*slot* [*/port*]]]]	DELL-ANETSUB00019535
show monitor session	show monitor session {*session-ID*}	DELL-ANETSUB00019535
show policy-map interface	show policy-map interface {interface-id} {in|out}	DELL-ANETSUB00131695
show port-security	show port-security [*interface-id* | all | dynamic *interface-id* | static *interface-id* | violation *interface-id*]	DELL-ANETSUB00131695
show privilege	show privilege	DELL-ANETSUB00019535
show qos maps	show qos map [dscp-queue | tcp-port-queue | udp-port-queue	DELL-ANETSUB00122116
show radius	show radius statistics [accounting | authentication] [{ipaddress | hostname | name servername}]	DELL-ANETSUB00131695
show route-map	show route-map [*map-name*]	DELL-ANETSUB00019535
show snmp	show snmp	DELL-ANETSUB00019535
show snmp engineID	show snmp engineID	DELL-ANETSUB00019535
show spanning-tree	show spanning-tree 0 [active | brief | guard | interface *interface* | root | summary]	DELL-ANETSUB00019535
show spanning-tree blockedports		DELL-ANETSUB00019535
show spanning-tree interface	show spanning-tree 0 [active | brief | guard | interface *interface* | root | summary]	DELL-ANETSUB00019535
show spanning-tree mst configuration	show spanning-tree mst configuration	DELL-ANETSUB00019535
show storm-control	show storm-control broadcast [*interface*] //show storm-control multicast [interface] // show storm-control unknown-unicast [interface]	DELL-ANETSUB00019535
show tacacs	show tacacs [ip-address]	DELL-ANETSUB00131695
show users	show users [all]	DELL-ANETSUB00019535
show version	show version	DELL-ANETSUB00019535
show vlan	show vlan [brief | id *vlan-id* | name *vlan-name*]	DELL-ANETSUB00019535
show vlan internal usage	show vlan internal usage	DELL-ANETSUB00122372
show vlan private-vlan	show vlan private-vlan [community | *interface* | isolated | primary | *primary_vlan* | interface *interface*]	DELL-ANETSUB00019535

APPENDIX H.DE - Dell Usage of Disputed CLI Commands

snmp-server community	snmp-server community *community-name* {ro | rw} [ipv6 *ipv6-access-list-name* [ipv6 *ipv6-access-list-name* | *access-list-name* | security-name *name*] | security-name *name* [ipv6 *ipv6-access-list-name* | *access-list-name* | security-name *name*] | *access-list-name* [ipv6 *ipv6-access-list-name* | *access-list-name* | security-name *name*]]]	DELL-ANETSUB00019535
snmp-server contact	snmp-server contact *text*	DELL-ANETSUB00019535
snmp-server enable traps	snmp-server enable traps [*notification-type*] [*notification-option*]	DELL-ANETSUB00019535
snmp-server engineID local	snmp-server engineID [local *engineID*] [remote *ip-address* udp-port *port-number engineID]*	DELL-ANETSUB00019535
snmp-server engineID remote	snmp-server engineID [local *engineID*] [remote *ip-address* udp-port *port-number engineID]*	DELL-ANETSUB00019535
snmp-server group	snmp-server group [*group_name* {1 | 2c | 3 {auth | noauth | priv}}] [read *name*] [write *name*] [notify *name*] [*access-list-name* | ipv6 *access-list-name* | *access-list-name* ipv6 *access-list-name*]]	DELL-ANETSUB00019535
snmp-server host	snmp-server host *ip-address* | *ipv6-address* [traps | informs] [version 1 | 2c | 3] [auth | no auth | priv] [community-string] [udp-port port-number] [notification-type]	DELL-ANETSUB00019535
snmp-server location	snmp-server location *text*	DELL-ANETSUB00019535
snmp-server user	snmp-server user *name* {*group_name* remote *ip-address* udp-port *port-number* } [1 | 2c | 3] [encrypted] [auth {md5 | sha} *auth-password*] [priv des56 *priv password*] [*access-list-name* | ipv6 *access-list-name* | *access-list-name* ipv6 *access-list-name*]	DELL-ANETSUB00019535
snmp-server view	snmp-server view *view-name oid-tree* {included | excluded}	DELL-ANETSUB00019535
spanning-tree bpduguard	spanning-tree bpduguard {enable | disable} no spanning-tree bpduguard	DELL-ANETSUB00114148
spanning-tree cost	spanning-tree [vlan vlan-list] cost cost	DELL-ANETSUB00131695
spanning-tree link-type	spanning-tree link-type {auto | point-to-point | shared}	DELL-ANETSUB00095249
spanning-tree mode	spanning-tree mode {stp | rstp | mst | pvst | rapid-pvst}	DELL-ANETSUB00131695
spanning-tree mst configuration	spanning-tree mst configuration	DELL-ANETSUB00131695
spanning-tree port-priority	spanning-tree [vlan vlan-id] port-priority priority	DELL-ANETSUB00131695
storm-control	storm-control broadcast [*percentage decimal_value* in | out] | [wred-profile name]] [packets_per_second in] // storm-control multicast packets_per_second in // storm-control unknown-unicast [percentage decimal_value [in | out]] | [wred-profile name]] [packets_per_second in] //	DELL-ANETSUB00019535
switchport access vlan	switchport access vlan *vlan-id*	DELL-ANETSUB00122116
switchport backup interface	[no] switchport backup interface {gigabit slot/port | tengigabit slot/port | port-channel number}].	DELL-ANETSUB00019535
switchport mode	[no] switchport mode private-vlan {host | promiscuous | trunk}	DELL-ANETSUB00019535
switchport private-vlan mapping	switchport private-vlan {host-association primary-vlan-id secondary-vlan-id | mapping primary-vlan-id [add|remove] secondary-vlan-list}	DELL-ANETSUB00131695
switchport trunk allowed vlan	switchport trunk {allowed vlan vlan–list | native vlan vlan–id}	DELL-ANETSUB00131695
switchport trunk native vlan	switchport trunk {allowed vlan vlan–list | native vlan vlan–id}	DELL-ANETSUB00131695
tacacs-server host	tacacs-server host {*hostname* | *ipv4-address* | *ipv6-address* } [port *number*] [timeout seconds] [key key]	DELL-ANETSUB00019535
tacacs-server key	tacacs-server key [*encryption-type*] *key*	DELL-ANETSUB00019535
tacacs-server timeout	tacacs-server host {*hostname* | *ipv4-address* | *ipv6-address* } [port *number*] [timeout seconds] [key key]	DELL-ANETSUB00019535
terminal length	terminal length *screen-length*	DELL-ANETSUB00019535
timers bgp	timers bgp *keepalive holdtime*	DELL-ANETSUB00019535
vrrp delay reload	vrrp delay reload seconds	CSI-CLI-04785577